BUTANE-PROPANE *News*

No. 16 SEPTEMBER 1940 25c

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HOME SERVICE BUILDS THE DEALER'S SALES (Page 17)
NO COLD WEATHER GAS FAILURES IF . . . (Page 23)

EVERY year, since the origin of the Butane-Propane industry, the preference for Hackney cylinders has increased. This fact is easily understood—when you study the performance records of thouands of Hackney liquid fuel cylinders in many types for hundreds of users.

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THE G. S. BLODGETT COMPANY, INC.

53 Maple St. - Burlington, Vt.

Volume 2
No. 9

BUTANE-PROPANE News

Reg. U. S. Pat. Off.

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LETTERS

● BUTANE-PROPANE *News* welcomes communications from those identified with the liquefied petroleum gas industry, but readers will understand that this magazine does not necessarily concur in the personal opinions so expressed.—Editor.

Gentlemen:

(1). What materials and jointing methods are best suited for butane installations—black iron, copper tubing, galvanized pipe, copper pipe, or aluminum tubing? (2). What advantages in economy of operation (increase in motor horsepower, economy in repair bills, extension of productive life of motor, consumption of motor oil, life of piston rings) does experience show when converting small gasoline engines from gasoline to butane?

J. E. K.

Lubbock, Texas

(1). Black iron, copper tubing and copper pipe are all satisfactory for butane installations. When black iron pipe is used, threads should be thoroughly cleaned and a good pipe dope used. With copper tubing, flare type fittings should be used for the joints. When brass or copper pipe is used, silver solder slip-on fittings make a very good joint seal. (2). Experience has shown that under normal conditions, gasoline engines converted to butane will consume approximately the same number of gallons per hour when using liquefied petroleum gas as they did on gasoline. Maintenance and repairs should be reduced from one-third to one-half; lubrication oil savings should be 75%.—Ed.

●

Gentlemen:

Will you please advise me what steps I should take to obtain a position in the LPG industry, preferably in sales—either of the product, itself, or equipment allied to the industry.

I am a graduate mechanical engineer and at present employed in an industrial survey for a propane distributor in the Philadelphia area. My entry into this field followed 15 years' experience in the manufactured gas industry, with one of the large Eastern utilities. Seven of these years were in engineering and operating departments and eight in industrial sales to a very diversified group of customers.

I can furnish references and location is no object.

M. A. HARD

R. D. 1 Phoenixville, Pa.

Is there a dealer or distributor among Butane-Propane *News readers who needs a man of this one's experience?*—Ed.

Gentlemen:

We would like some engineering information on bottled gas. Do you have a table which shows the transposition from liquid gas by the pound to available B.t.u.'s?

G. E. P.

Dowagiac, Michigan

The answer is to to be found on page 8 of Handbook Butane-Propane Gases *where, in the table of constants of liquefied petroleum gases, is listed the following: B.t.u.'s per pound—ethane, 22,216; propane, 21,633; normal butane, 21,331; isobutane, 21,331.*—Ed.

●

Gentlemen:

We would like to take advantage of the offer of your Research Department. Can you tell us the total amount of liquefied petroleum gases that are sold in the country over a year's period?

L. Y. H.

St. Louis, Missouri

The complete report of the U. S. Bureau of Mines for LPG sales for 1939, compared with sales for 1938, was published in the August issue of Butane-Propane *News, beginning on page 9. Total sales for 1939 were 223,580,000 gals.*—Ed.

●

Gentlemen:

I am interested in the properties of butane gases as a possible use as a refrigerant.

J. J. C.

Fort Worth, Texas

Butane and propane can be used as refrigerants in place of ammonia SO_2, or other similar materials. Propane, especially, is used extensively in the natural gasoline industry and in oil refineries as a refrigerant. The fundamental data with respect to latent heat can be found in Handbook Butane-Propane Gases, *pages 6, 189, 305.*—Ed.

●

Gentlemen:

I am seeking a small propane engine for use with a small capacity pump, and would appreciate any information you have on the availability of such an engine.

T. C. B.

Polson, Montana

If you will tell us the number of gallons per minute that you wish to pump, and at what pressure, we will determine the horsepower needed and can then recommend the different types of engines which would be best suited to your purpose.—Ed.

USE OUR RESEARCH DEPARTMENT

The BUTANE-PROPANE News technical staff will gladly endeavor to answer all legitimate inquiries (except legal and financial) about the LPG industry which regular subscribers submit.—Editor.

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● Over a million of the famous South Bend "Malleable" Ranges averaging over 25 years each in service, have been sold in rural America. South Bend Hotel and Cafe Ranges, Griddles, Bake Ovens, Hot Plates and Broilers everywhere enjoy the highest consumer popularity. The "*South Bend*" name is an accepted mark of highest quality and almost unbelievable durability among range users of all classes — better ranges or greater values are not produced.

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MAINLY BEYOND THE MAINS

THERE'S AN LPG BATTLE FRONT, TOO

Mark Anton, of the Suburban Gas Co., which distributes considerable bottled gas in New Jersey, New York, and Eastern Pennsylvania, evidently read with interest our editorial, "Dirty Pool," in the August issue. In fact, in a recent letter he commended BUTANE-PROPANE *News* for bringing strongly to the attention of the industry, the government's "unneutral" attitude as evidenced by its reluctance to finance bottled gas appliances and equipment. However, Mr. Anton takes up where the editorial (which stated that something should be done) left off, and states specifically just what should be done, outlining a 7-point battle front along which the Liquefied Petroleum Gas Association may well open the attack. In parphrasing Mr. Anton's words, we discover that the Liquefied Petroleum Gas Association . . .

1. Should make every effort to prevail upon the Electric Farm and Home Authority to extend its most generous sales plan to cover the sale of liquefied petroleum gas appliances.

2. Should use its influence towards having bottled gas equipment financed under the F. H. A. Improvement Loan Plan.

3. Should prepare articles (as does the American Gas Association and Pacific Coast Gas Association) pertinent to the development and use of liquefied petroleum gases for publication in the trade journals of the poultry, metal cutting, brewery, textile, and other industries served by LPG.

4. Should distribute to its members vital information concerning competitive fuels, especially facts or figures unfavorable to the employment of electric cookery.

5. Should assemble and distribute data on type and frequency of electric range accidents to housewives, fatal or otherwise.

6. Should organize and place where it will do the most good, a propaganda

campaign, nationally, to offset the "smear" of the open flame propaganda.

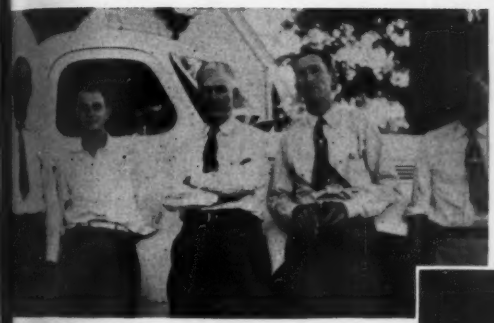
7. Should use its influence to have liquefied petroleum gas specified as a compulsory improvement in repossessed H.O.L.C. houses located beyond the gas mains.

With Point No. 7 Mr. Anton stops, indicating that there are even further fields which the Liquefied Petroleum Gas Association, its co-operating members, and the industry at large must conquer. And speaking of conquering, recent and current unhappy events have taught us that the group which conquers is one whose members are skilled in the use of the most improved and modern methods of attack, where each individual knows and performs his job with deadly effect so that the common good may best be served. This is an era of efficiency and cooperation, and once a task is set before the Liquefied Petroleum Gas Association and the industry at large, it is paramount that every individual make every effort to see that that job is done with a maximum of business-like dispatch.

CONSIDER THE CONSUMER

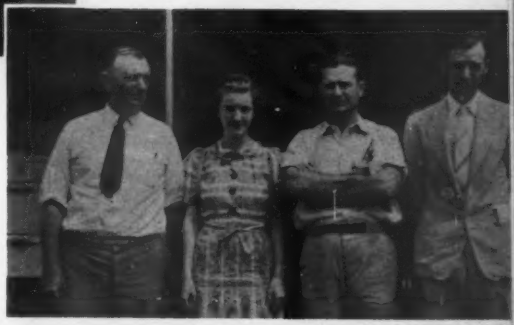
Sales promotion literature that is geared to the consumer's interests, instead of to what the bright young copy writers in the sound-proof rooms think *should* be his interests, always arouses our unbounded admiration. And because it does, we believe the latest Servel booklet, "How Farm Requirements are Met with Servel's Adaptability," rates a rousing cheer. Here is a 32-page job that devotes 25 of those pages to showing the farm family just how they can arrange their box to accommodate the greatest storage of the things that actually find their way into a farm refrigerator. Large cuts of meat, cream cans, milk kettles, crocks, egg baskets and dressed chickens, are shown in various photographs, stored in a refrigerator as they would have to be to make such equipment valuable to a farm home.

Any farmer and his wife reading this piece would realize at once that it was written in their language, and with an understanding of their requirements. It is comforting to old time agrarians like ourselves to know that Servel is sympathetic to our needs. And by the Eternal, when we get back to the land as we inevitably expect to do, the first batch of fryers that we dress out for the market are going to be chilled right in an 8-foot Servel.



Personalities Helping the Industry To Forge Ahead

TOP OF PAGE: Bulk plant and employes of Tennessee Butane Gas Co., Inc., Nashville, Tenn. ABOVE: W. W. Wilson, Charlie Clark, S. S. Scarborough, Mack Garvin and A. C. Shope, of Butane Equipment Co., Fort Worth, Texas. AT RIGHT: B. T. Harris, manager; Miss Mary Nell Wallace, Ray L. Downs and Henry Culver, of Butane Gas Co., Inc., Little Rock, Ark.



AT LEFT: Tank delivery truck of the Central Georgia Gas Co., Inc., Statesboro, Ga., with employes in front. Second from left is W. Overstreet, president; then Mrs. A. B. Purdom, secretary, and A. B. Purdom, vice-president.

AT TOP: The new Suburban Gas Co. plant* at Whippany, N. J. JUST ABOVE: A last-minute inspection of the feeding facilities convinced the host, Suburban's President Mark Anton, that the provender would hold out if the table would only hold up. At the taps, and cheerfully kibitzing his boss's efforts, Suburban's wholesale manager, S. J. McLagan, looked on. BELOW: Early arrivals Roy E. Forsberg of Country Homes Gas Service, Suffern, N. Y., Elliott Taylor, Butane-Propane News, and Ed Braen, of Protane Bottled Gas Service, Hawthorn, N. J., had greetings and refreshments at the hands of Host Anton.

◆

Butane-Propane News Goes to a Plant-Warming

By ELLIOTT TAYLOR

A CHANCE to meet competitors, inspect a brand new and modern 15,000-gal. propane bulk station, ask questions and scoff at answers—to say nothing of beer and a buffet lunch for additional bait—were the rational reasons for drawing liquefied petroleum gas dealers, wholesalers and distributors from New Jersey, New York and Pennsylvania to the opening of the Whippany, N. J. plant of the Suburban Gas Co. in July.

The Whippany plant is the third bulk station to be built by Suburban since its first undertaking at Belvedere, N. J., which was put into operation in 1931, and is the most modern of all from the standpoint of LPG handling facilities.

*All photos courtesy of William Hauck, Wm. B. Scaife & Sons Co., New York.

Lingering near the charging manifold, Samuel Kapnak, Natural Gas Co. of New Jersey, Hammonton, N. J.; Frank Andrews, Philgas; Mark Anton and George R. Williams, assistant treasurer of Suburban, talk over details.

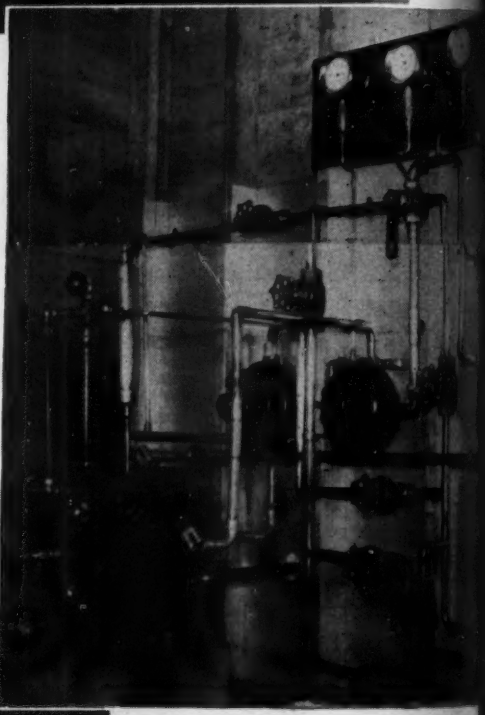
The sun was hot, and for no other reason, Don Wilson, Pyrofax distributor of Ledgewood, N. J., and Ruth E. Swenson, secretary to the president of Suburban, repaired to the inviting shade of the garage-buffet for lunch.

Some of Those Present

Frank M. Andrews, district manager of Philgas, and Wm. Torpy, division sales manager of Suburban, demonstrate complete competitive understanding for the cameraman. Suburban's 5000 domestic consumers are located in a territory bounded on all sides by Philgas activity.

Up drove C. E. Puco, of Blu-Gas Bottled Service, Netcong, N. J., one of Suburban's 15 wholesale accounts. Combining business with pleasure, Puco backed up to the filling plant with a small batch of empties. In addition to wholesalers, who own their own tanks and installations, Suburban also sells to 15 distributors.

ABOVE: In the filling room Suburban's Engineer Joseph Lurker, conducted a private dress rehearsal of his cylinder charging manifold. Co-designer with Mark Anton of the entire Whippany plant, he wanted no horselaugh to arise from professional throats when he put his equipment through its paces for competitors, confreres and observing customers.



RIGHT: Three hundred feet from the railway siding, a Brunner R 5000 compressor unloads cars and fills cylinders by the new pressure differential method used at Whippany.

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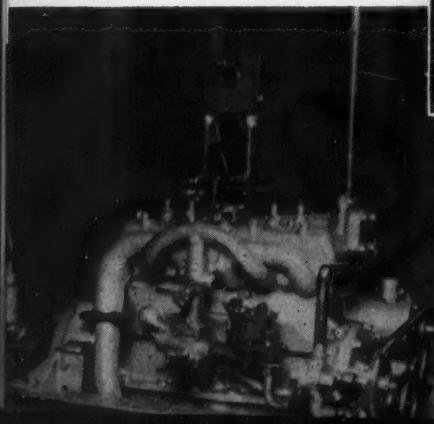

LEFT: Motive power for the compressor is supplied through a direct connected Model A Ford engine, housed in an adjacent room. Gas drawn from the top of the storage tanks and fed through an Ensign carburetor and regulator hookup is the fuel.

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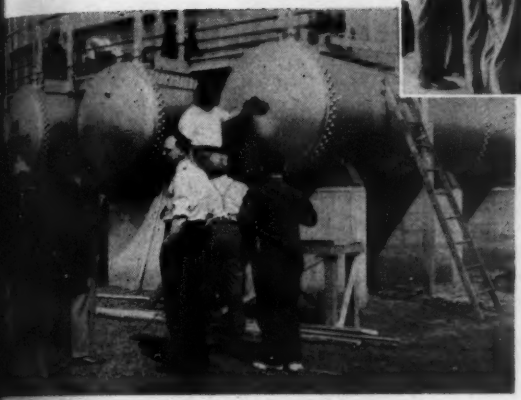
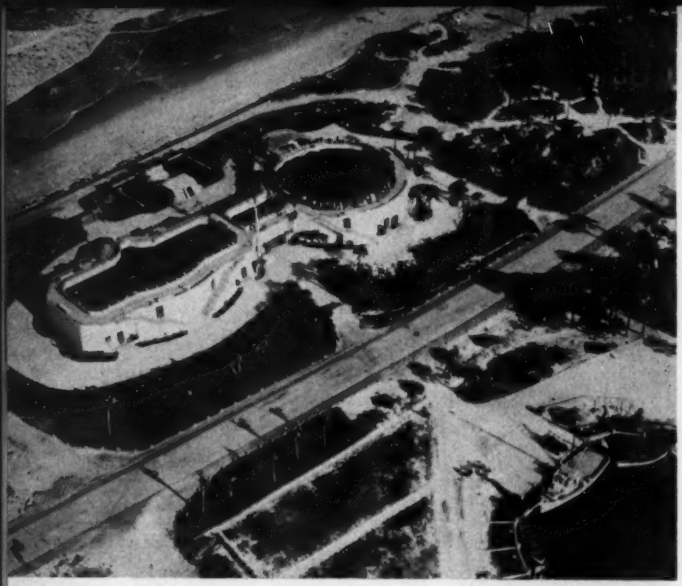
Inspection and Then— Goodbye



ABOVE: Filling the Blu-Gas cylinders drew an audience as Engineer Lurker explained operations. A vacuum line draws the cylinder pressure down to a minus atmospheric pressure, discharging the cylinder vapor into the top of the storage tank. The flow is reversed and a combination of pressure from the storage tank and vacuum in the cylinder speeds filling. To insure against over-filling, scales have automatic cut-off attachments.

ABOVE (left): The filling operation completed without a hitch, the guests drift about the plant. Some are interested in the details of the hook-up of the five 3000-gal. tanks. All are impressed by Mr. Lurker's statement that the compressor method of handling bulk propane makes possible the unloading of a car in four hours, as compared to eight hours required in Suburban's Belvedere and Farmingdale plants, where pumps are used.

As shadows begin to lengthen the crowd rallies to Photographer Wm. Hauck's call for a group picture. That inevitable ritual completed, farewells and thank-yous were in order.



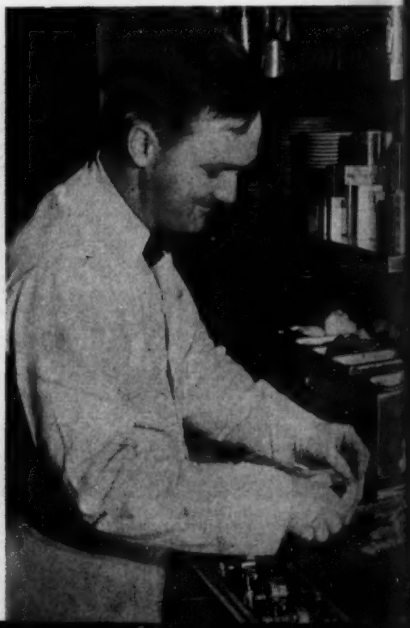
LPG Is a Byword At Far-South Salt Water Fairyland

ABOVE: Air view of Marineland, Fla., showing oceanariums and (in right foreground) Marine Studios fishing fleet.

CENTER (left): Bulk station of A. W. Spiller's 15,000-gal. Suburban Gas Co. bulk station at St. Augustine, Fla.

BELOW (left): Broiling a special order at the "Dolphin." Green's Fuel is used here for cooking and heating operation.

BELOW (right): LPG on the job at the back bar of the "Periwinkle."



Gas Does the "Four Big Jobs" at Florida's Marine Studios

OF the many and varied uses of liquefied petroleum gas throughout the country, probably none has been more prominently identified in the public mind than that at Marineland, St. Augustine, Fla., where, under the name of Green's Fuel, it is used for the "four big jobs" of cooking, refrigeration, air conditioning and water heating, its high efficiency enjoyed by visitors from all over the world.

Designed for Motion Pictures

Noted as one of the main tourist attractions of Florida, this Oceanarium (the Marine Studios) is operated somewhat on the same basis as an endowed university, designed specially for professional under-water motion pictures.

One of the differences between Marine Studios and other aquariums lies in the fact that there marine life is not segregated in small tanks by species, but placed together as it exists in the open sea.

Two huge tanks, one a circular tank 75 feet in diameter, the other a rectangular tank 100 feet in length, comprise that unique institution. Enclosed galleries run the perimeter of the building, and in the sides and bottom more than 200 large, glass portholes have been placed for the observation of deep-sea denizens as they seek out a normal existence.

In those gigantic reservoirs have been placed a seven-ton coral reef, a five-ton rock garden, and countless numbers of sea-fans, shells, and plumes. There, gayly colored tropical fish seek protection from their predatory enemies. Porpoises rise to the surface to breathe air from the curious blow-hole in the top of their heads. Clumsy turtles, some weighing 300 pounds, lumber lazily through the irridescent waters. A 1000-pound sea-cow patiently nurses her 300-pound "youngster." A school of mullet stupidly stumble over themselves as they endeavor to forsake the path of a mammoth shark.

Nature's mysterious, salt-water fairyland has been duplicated — on land!

A Dream Made Real

W. Douglas Burden, trustee of the American Museum of Natural History, is the author of the dream that has materialized and is now attracting scientists, motion picture technicians, and laymen from all corners of the globe.

Conceived as a scientific institution, its secondary aim is to provide the setting and atmosphere required for the making of underwater motion pictures.

Heretofore it had been necessary to either build small miniature tanks for underwater photography—thus losing the perspective, and the opportunity

to work with giant specimens—or to go below the surface of the ocean in diving suits and bells. This latter method was almost totally unsatisfactory, inasmuch as it was necessary for the cameraman to wait for fair weather, and after that—weeks of patient waiting for the fish to swim by.

Equipped with its own modern laboratory, Marine Studios has a competent staff of biologists who are constantly cataloging the newly deciphered knowledge garnered from the lives of the "inmates."

To see the semi-tropical setting, one would never think that the Dolphin tavern and the Penquin bar at Marineland would need butane for heating—but they do, and like it!

Quite naturally, so unusual a spectacle, housed within a semi-tropical setting, attracts huge throngs of visitors. They are the ones upon whom are impressed the remarkable conveniences of liquefied petroleum gas for all household purposes—they and the attendants whose work is lessened.

Gas for Every Need

The administration building, incorporating seven offices and reception room, is heated with Green's Fuel. The Marine Village, which furnishes modern lodging, hotel rooms, apartments and beach cottages, uses the same gas for space and water heating. At the Dolphin Tavern it provides fuel for automatic baking ovens, ranges, refrigeration, steam tables, coffee urns, ceramic broilers, deep fat fryers, automatic dish washing, and water heating, and the Periwinkle lunch room burns gas for all cooking purposes. New buildings scheduled for early completion will add to the consumption of gas at the Studios.

The installations at Marineland have been made by the Suburban Gas Co., of St. Augustine, owned and managed by A. W. Spiller, who has the distribution of Green's Fuel in four Florida counties.

Cooperates with Utility

A factor that has contributed to a doubling of Mr. Spiller's business the past year is a cooperative agreement with the St. Augustine gas company which provides for reciprocal sales efforts in besting competitive fuels in the city and surrounding territory. By respecting each other's separate provinces and always emphasizing the merits of gas, these firms have caused the public to become gas minded and less responsive to the arguments for other fuels.

How Home Service Helps to

Build the Dealer's Sales

By JANE TIFFANY WAGNER
Director of Home Economics, Servel, Incorporated

"WOMAN'S place is in the home" . . . of customers, showing them the advantages of modern fuel service and instructing them in the proper use of modern gas appliances!

JANE T. WAGNER

The truth of this modernized version of an old, familiar phrase has been so effectively proved by the gas utilities who have employed women to promote customer desire for ownership of modern gas equipment and to insure customer satisfaction with service rendered and appliances purchased, that liquefied petroleum gas dealers and distributors are profiting by their example and experience in establishing Home Service or Home Economics departments.

At the present time, there are more than 600 Home Service departments of gas utilities in the United States, in which approximately 1500 women are employed. Home Service departments are also maintained by gas companies operating in Canada, Cuba, Hawaii, the Philippine Islands, Puerto Rico, New Zealand, Australia, and South America.

Through our department of Home Economics for Servel, Inc., makers of the Servel Electrolux refrigerators, we are in frequent contact with these Home Service departments through correspondence and by personal visits to the localities in which their excellent work is done.

We are often asked what a Home Service representative can do for a dealer, what her qualifications should be, and what results can be accomplished by Home Service activities. Naturally, each dealer organization will have specific aims, individual problems, and sales conditions which may apply particularly to one area. In the following discussion of Home Service objectives, activities, and qualifications, however, we have outlined those which we believe generally applicable to a majority of liquefied petroleum gas dealers and distributors:

I. OBJECTIVES—

A. To insure maximum customer satisfaction by instructing each customer in the proper use, care, and operation of modern gas appliances as well as explaining the value of a new type of fuel service.

B. To reduce the number and cost

of service calls by careful customer education as soon as possible after the installation of new service or new appliances.

C. To assist the salesmen of dealer organizations to find and to close prospects for modern gas appliances such as gas refrigerators, ranges, water heaters, etc., and to render assistance in adding new customers for liquefied petroleum gas service.

D. To provide educational material for dealer sales organizations by conducting special classes for salesmen on food preparation and food preservation and the use of modern gas equipment as a means of stimulating sales enthusiasm.

E. To supply graphic proof that the appliances fulfill the salesman's claims for them by presenting convincing food lecture demonstrations in the homes of prospects and purchasers, in the dealer's store or display room, in schools, and before special groups of women's organizations in private or public meetings.

II. SUGGESTED ACTIVITIES—

A. **Home Calls.** Following the installation of a new appliance or of fuel service to a new customer, the Home Service representative calls on the purchaser to instruct her how to use the appliance and service to the best advantage. It is especially important that the owner understand the proper operation and care of appliances and service early in the period of ownership, in order that maximum satisfaction will result. Modern gas appliances and liquefied petroleum gas service will be the subject of praise and enthusiastic recommendation by new owners if they understand their operation. If unsatisfactory service resulting from lack of knowledge concerning the appliance or the service is allowed to develop, it creates customer dissatisfaction which spreads to the owners' friends and acquaintances and results in lack of confidence in the product. A Home Service representative can assure proper use of equipment and service by detailed instruction.

No matter how perfect the installation may be, mechanically, or how carefully it is checked by a service man, there is still the probability of expensive and unnecessary additional service calls, unless the customer is given expert instruction on the use of her new appliance.

One important result of home calls in addition to the assurance of customer satisfaction, is the number of prospects for new appliances which may be secured by the Home Service representatives. These include both prospects for liquefied petroleum gas service and prospects for additional equipment. When a call is made while a new owner is enthusiastic, she is usually eager to tell her friends about her new conveniences and interested in their knowing of the new equipment and service. She often makes a special effort to give prospects to the Home Service representative in return for the friendly service which has been extended to her.

Still another result of the home call is the record of customer reaction toward the company's policies, service, etc., which can be particularly useful in building good will when a new company enters a community or when an established company offers new

services and equipment in a community.

Some dealers and distributors also send Home Service representatives to follow up high bill complaints, particularly when there is reason to believe that the amount of the bill may be due to the customer's extravagant use of the liquefied petroleum gas service.

B. **Demonstrations.** 1. *Kitchen Parties in the Homes of Prospects or Purchasers:* These special group demonstrations in the homes of prospects or purchasers of Servel refrigerators are usually held in the evening if possible, in order that both men and women may attend. Both the salesman and the Home Service representative attend. The food demonstration given by the Home Service representative proves the claims made by the salesman in his talk, and re-emphasizes the exclusive advantages of the equipment. Food prepared in the refrigerator and stored in advance of these demonstrations is served to the group.

2. *In the Dealer's Store:* (a) Home Service can give very effective sales aid when used to assist salesmen in finding prospects and in helping to close prospects who have shown definite interest and intention to buy but have delayed signing the order. In closing prospects, two plans have been used with success. One is to have a special demonstration "party" in the dealer's store in the evening for a small group of prospects submitted by the salesmen. In her demonstration, the Home Service representative emphasizes the particular features or advantages in which the salesmen indicate their prospects have shown most interest in their previous contracts.

(b) *Floor or Store Display Demonstrations:* If neither group demonstrations in the home nor evening demonstrations in the dealer's store are feasible, special prospects may be brought to the dealer's display room by the salesmen, introduced to the Home Service representative, and given special brief demonstrations there. The floor or store display demonstration is also of value in finding prospects. This type of demonstration is usually held during a time when store traffic is heaviest in order that it may receive the maximum attention from customers coming into the store.

(c) *Demonstrations for Dealer Sales Organizations:* Demonstration classes for salesmen have proved productive in many ways when conducted by Home Service representatives. Many salesmen are familiar with the "talking points" of gas equipment, but have never heard the gas refrigerator or the gas range explained from the viewpoint of the woman who is the prospective purchaser nor seen the conveniences of the equipment in actual use. Brief classes for salesmen conducted by the Home Service representative not only serve to familiarize the salesmen with the product, but also serve to generate sales enthusiasm. Demonstrations in which the salesmen take part, help to stimulate lagging sales interest and to keep the salesmen supplied with practical information which is of vital help in sales contact.

3. *Outside Activities with Special Groups:* (a) *Rural Women and Girls*—Effective contacts can be made by the Home Service representatives

in conducting home equipment and food demonstrations before groups of rural women and girls who are members of the community, county, and state Extension organizations. Arrangements for demonstrations by a Home Service representative for 4-H Club or Adult Extension Club organizations can be made through the county home demonstration agent. These demonstrations are not only valuable in acquainting large groups of rural homemakers with the dealer's equipment and service, but are also an effective means of establishing contacts which can be followed up later for group demonstration appointments in rural homes.

(b) *Urban Organizations:* Church, social, philanthropic, and study groups of women often have special assembly rooms or auditoriums at their disposal in which the Home Service representative can present a demonstration, or a series of lecture-demonstrations to which members of these influential groups in community life are especially invited.

(c) *Educational Groups:* Conducting demonstrations before the students of home economics, household engineering, physics, general science, and engineering classes of high schools, colleges, and universities is an important activity in promoting the use of a new fuel service and of modern gas equipment in the dealer's community. In this way, a Home Service representative can not only familiarize teachers with the service and equipment which are available, but she also publicizes the equipment and service with students who carry the information into their homes. Because of the widespread efforts of government leaders and various organized groups, girls and women today are becoming vitally interested in learning factual data about home equipment which will make them "better buyers." It is important, therefore, that teachers and students, and adult members of the community who are naturally interested in equipment and services for the home be reliably informed and actively interested in modern gas equipment and liquefied petroleum gas service.

(d) *Fairs, Exhibits, Markets, Model Homes, Furniture, and Appliance Shows:* Home Service demonstrations at county fairs, exhibits, model homes, furniture and appliance shows and other community gatherings have proved to be a valuable asset in centering public attention on modern gas equipment. Prospects are frequently secured in Home Service contacts of this kind which can be turned over to the dealer for sales follow-up.

In communities where public markets are located, to which farm families come to sell produce and urban families come to buy, a Home Service representative can effectively focus attention on the need for modern gas equipment and a modern fuel service by periodic demonstrations.

(e) *Cooking School Groups:* Community newspapers frequently conduct cooperative cooking schools in the dealer's area, featuring home equipment. The Home Service representative can take part in these, frequently demonstrating the service as well as the equipment.

C. **Preparation of Home Service Literature:** The Home Service representative can prepare special literature

on food preparation and preservation, based on a knowledge of local food preferences and market conditions. This information can be used as door-opener material by dealer salesmen, or may be mailed to prospects to keep up their interest in new equipment in the periods intervening between sales calls.

III. QUALIFICATIONS—

A. It is recommended that a college graduate in home economics, recently graduated, who has specialized in Household equipment and who has had some experience in Home Service work with a utility company will be particularly well fitted for this kind of activity for a liquefied petroleum gas dealer or distributor. Such a woman or girl will possess the following qualifications:

1. A practical knowledge of the varied uses of equipment in the home based on scientific use and experimental work in laboratory practice and under home conditions.

2. A workable knowledge of the engineering principles involved in equipment and service operation.

3. Useful information relative to competitive types of equipment and service which could be valuable in sales training.

4. An understanding of the value of modern fuel service and modern gas equipment, and of the various ways to promote the advantages to create a desire for ownership among homemakers.

B. In addition to specialized knowledge of home equipment, it is advisable for the Home Service representative who is employed by a dealer or distributor of liquefied petroleum gas products or equipment to have the following qualifications:

1. Ability to interpret and translate all information in terms of appliance sales or service contracts.

Home Service girls know the importance of displaying tempting dishes in their Electrolux refrigerators when demonstrating to women prospects.

2. Ability to direct all ideas and activities toward the objectives of increasing customer satisfaction, adding new customers to service lines, reducing service calls, and increasing appliance sales.

3. Ability to plant, organize, and present forceful, convincing food and merchandise demonstrations.

4. Ability to speak well before groups.

5. Ability to write informative, constructive reports.

6. Ability to adapt herself to all types of people, surroundings, and situations.

7. A friendly, cooperative attitude.

8. An attractive, well-groomed appearance.

IV. RESULTS EXPECTED—

It is, of course, impossible to predict exact results which a dealer or distributor of liquefied petroleum gas who employs a Home Service repre-

sentative may expect to accomplish, for results will depend on the type of activity decided upon, the ability of the Home Service representative, and the support given to her by members of the sales organization in executing cooperative plans.

As positive proof of the results which can be accomplished by Home Service representatives already associated with various kinds of sales organizations, distributor, dealer, utility, etc., the following "case records" offer convincing evidence of the value of Home Service in rendering tangible sales assistance:

CASE NO. 1—"My fourth sale, a six cubic foot refrigerator," reports a salesman, "was sold after three calls by the Home Service department girls. The customer was very much electrically minded, but finally was convinced that a gas refrigerator was a better buy."

CASE NO. 2—"Mrs. T., my first sale," explained another salesman, "had been contacted by our Home Service girl and was very much interested in the Servel Electrolux gas refrigerator. She called the office in the morning and I sold her a six cubic foot refrigerator very easily."

CASE NO. 3—"A special program for the Tulsa district, the Thrifty Shoppers Campaign sponsored by local women's organizations, presented an opportunity to demonstrate modern gas appliances, emphasizing the Servel Electrolux gas refrigerator and the gas range, during the month of February. Approximately 500 women were contacted as the result of this activity and through the supervisor's office, prospects were turned from the campaign office headquarters to the four local dealers participating in the special campaign and selling Electrolux refrigerators. Outstanding was the fact that one dealer reported receiving 115 prospects from which 53 sales resulted."

CASE NO. 4—"Salesmen of a Middlewestern gas company found that the Home Service department's 'prospect parties' held in the evening at the gas company for the 'hard-to-sell' customers resulted in the closing of sales to 25 to 33% of those present. The salesmen invited 20 prospects from their lists, made up of families who were interested, but hadn't signed orders, to a sales slanted demonstration of the Servel Electrolux gas refrigerator conducted by the Home Service department. Twice the salesmen closed 100% of the prospects present, and usually the percentage of signed orders was 25 to 33. In a group in which 29 families were present, four sales were closed the night of the demonstration, and eight followed in less than a week."

Surely such results as these, which are proven attainable by Home Service records of achievement in sales endeaver, well warrant the reasonable cost of employing and maintaining a Home Service department by a dealer or distributor in the liquefied petroleum gas field.

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State Teachers College In Oklahoma Installs LPG

During the latter part of August, Butane Consolidated Co., Oklahoma City, Okla., installed equipment for hot water heating and cooking for the Northeastern State Teachers' College, at Tahlequah, Okla. This equipment included one 10-hp. boiler and one 15-hp. boiler in the women's and men's dormitories. These, using butane fuel, will furnish hot water for baths and other purposes for the school. The fuel is supplied through one 1000-gal. and one 500-gal. butane tanks equipped with heat exchangers. These can take care of a heating load of 1,500,000 B.t.u.'s per hour, according to Mr. Elkin.

The Butane Consolidated Co. has removed from its old location at 1317 South Agnew to 115 North Western Ave., where it has three times more floor space than before, and is now facing a busy street nearer the main traffic centers of the city which furnishes advantageous display for the complete line of LPG appliances and equipment carried in stock.

No Cold Weather Gas Failures IF . . .

PERHAPS one of the most vital questions in the minds of Southern LPG dealers is "Will we have the same amount of service work and excessive number of refueling of customers' underground storage tanks during a severe cold spell next winter as we have had this past winter?"

W. H. HOAGLAND

If everyone here had read all of the technical data given in the first three chapters of the "Handbook Butane-Propane Gases, Revised Second Edition," all of you would know the answer to this question. I am purposely avoiding any technical discussion of this subject, due to limited time, but I hope a few practical illustrations from actual experience in the field, together with remedies later outlined, will serve to answer this question and prevent a recurrence of your gas failures during cold weather.

First, consider a simple chart showing the most commonly used liquefied petroleum gases, namely, butane, isobutane, and propane. (Fig. 1.)

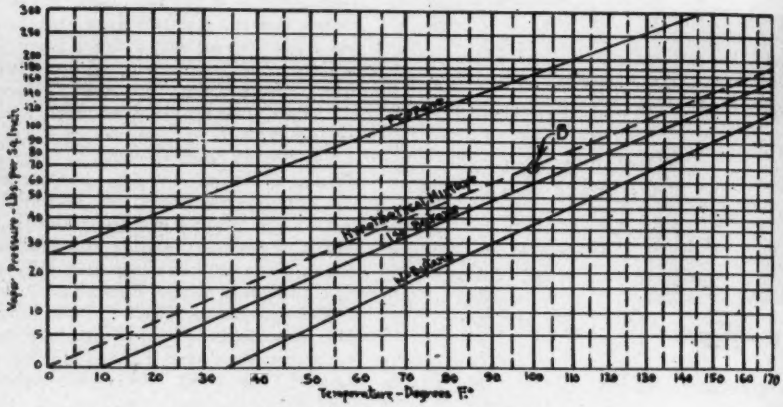
From the upper graph, you will see that butane boils or generates gas pressure at approximately 32° F. Isobutane boils or generates gas pressure at approximately 10° F. Propane boils or generates gas pressure at approximately –44° F.

The lower graph's title, which is important, is "Vapor Pressure at 100° F. in Pounds Per Square Inch Gage of Butane With Various Percentages of Isobutane and Propane by Liquid Volume." There is assumed a hypothetical mixture of 60% butane, 20% isobutane and 20% propane. From this lower graph you will find at point "A" a resultant pressure of 72 lbs./sq. in. gage at 100° F. Now refer to point "B" on the upper graph through which a dotted line

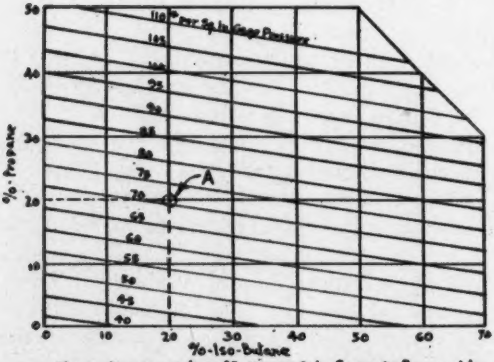
● Last winter when unusually cold weather swept the nation for a period of several weeks, many users of liquefied petroleum gas systems —in Southern states, particularly, where similar low temperatures had not been known since the advent of LPG—found themselves without fuel due to the systems "freezing." Dealers, distributors and producers were besieged with complaints and service demands. Was the fuel to blame? Or, the systems? Or, the appliances? Or, just the weather? To prevent a recurrence, sound analyses and scientific solutions became imperative. These were forthcoming from Walter H. Hoagland, of the Technical Products Department, Shell Oil Co., Inc., St. Louis, and they were given in the accompanying paper entitled, "Facts About Your Fuel," delivered before the 1940 Spring meeting of the Southern Section, L.P.G.A., in Birmingham, Ala.—Editor.

VAPOR PRESSURE OF MIXTURE
Butane - 60%
Iso-Butane - 20%
Propane - 20%

Temperature Degrees - F.°	Vapor Pressure Lbs. per Sq. Inch
10	3
20	7.5
30	12.
40	17.5
50	24
60	32.
70	40
80	48
90	60
100	72.



VAPOR PRESSURE VS. TEMPERATURE



VAPOR PRESSURE AT 100° F. - LBS. PER SQ. IN. GAGE - OF BUTANE WITH VARIOUS PERCENTAGES OF ISO-BUTANE AND PROPANE BY LIQUID VOLUME

Fig. 1. Vapor-pressure chart of Butane-Isobutane-Propane Mixtures.

has been drawn parallel to the lines showing butane and propane characteristics. This point "B" shows a pressure of 72 lbs./sq. in. at 100° F. of the hypothetical mixture. In analyzing this dotted line of the hypothetical mixture, you will note that it has a boiling point of 0° F., which corresponds to the fuel some of you here refer to as winter fuel, or zero butane.

This fuel has a vapor pressure of 3 lbs./sq. in. gage at 10° F., 7.5 lbs./sq. in. gage at 20° F., 12 lbs./sq. in. gage at 30° F., 17.5 lbs./sq. in. gage at 40° F., and so on to 72 lbs./sq. in. gage at 100° F. These two curves were copied and elaborated upon from a pamphlet of the regulations of the State of California concerning liquefied petroleum gases. Having such a curve, it is a rather simple matter to ascertain the vapor pressure of any mixture of these three fuels at lower temperatures.

Propane for the North

The bottled gas industry is growing just as rapidly in the North as the butane gas industry is in the South. Propane is used almost exclusively as bottled gas fuel, although there are a few distributors that use a mixture of butane and propane. In most installations in the North, the connected load to appliances is not large and probably does not average 60,000 B.t.u. per hour per installation. Vaporization difficulties do not occur because the boiling point of propane, or the temperature at which gas begins to form is about –44° F. If there happened to be a bottled gas installation in extreme northern Minnesota or in northern Montana where outside temperatures of –44° F. did occur, that installation would have the same problem of vaporization as you have had as a group during the past heating season in the South.

Buried Tanks in South

In the South, the average connected load per installation to an underground storage tank, especially where space heating is involved, is in excess of 60,000 B.t.u. per hour. Because butane is a higher boiling point fuel than propane, we bury the storage tank in order to utilize heat from the ground. Storage tanks are supposed to be buried below the frost line. Why? To prevent a temperature of 32° F. or less around the tank in the surrounding dirt or earth. I personally know of at least 50 so-called underground storage tanks that are not six inches below the ground surface, and temperatures of 25° F. were recorded by actual thermometers in surrounding earth around these tanks during extreme weather last January. The butane consumer storage tanks should be buried so that the top of the tank is below the frost line. This is one remedy that will assist in preventing the recurrence of gas failures and excessive service calls.

Let us place this hypothetical mixture of 60% butane, 20% isobutane, and 20% propane in this underground storage tank below the frost line. As long as the surrounding earth supplies the necessary heat to vaporize, say, 60,000 B.t.u. of .55 gal. per hour, there will be no drop in temperature of the liquid mixture in the tank. But if 100,000 B.t.u. load is

being drawn off and utilized from this same buried tank, the ground may not be able to supply the necessary heat required to vaporize approximately one gallon per hour and a refrigeration or cooling of the liquid mixture occurs which lowers the temperature of the mixture. When the temperature of the mixture is lowered, the pressure of the gas produced is also lowered. If a temperature of 32° F. is reached in the mixture, the butane will cease to evaporate and isobutane and propane only will vaporize. By observation, I have seen temperatures in the liquids of buried storage tanks from –6° F. to 20° F. on days when the atmospheric temperature was 60° F. In the case of these extreme low temperatures, the buried storage tank was not large enough to receive sufficient heat from the ground to vaporize the fuel to be utilized.

Climatic Conditions Are Vital

Recently came literature from a manufacturer of underground tanks which states: "A 100-gal. butane capacity storage tank suitable for operation of a cook stove and other small gas-consuming appliances—25 cu. ft. per hour; a 200-gal. capacity butane storage tank suitable for operating a cook stove and other small gas appliances—approximately 50 cu. ft. per hour; a 300-gal. capacity butane tank suitable for cook stove and small house heating—100 cu. ft. per hour; a 500-gal. capacity butane storage tank for all purposes—150-cu. ft. per hour; a 1000-gal. capacity butane storage tank for all purposes—200-cu. ft. per hour." This tank manufacturer is apparently trying to advise his respective customers of the approximate amount of vapor that can be satisfactorily withdrawn from the storage tanks in the respective sizes indicated, and even though it may be based on actual test experience these figures cannot be taken to apply to all points in the South in general because of the wide variation in climatic conditions. In summing up this thought, the size of the tank for the connected load in which the gas is to be utilized is of extreme importance.

Typical Complaint

We have in our files many complaint letters from distributors, which may be summed up as follows:

"The last car of zero butane you shipped has been received. When it arrived and we unloaded it, the pressure on our bulk storage tank was 33 lbs./sq. in. gage and the temperature of the liquid was 60° F. We have had a recent cold spell and when we go out to the customer's tank we find no gas pressure. With the slip tube gage or float gage the tank is shown one-third full and, therefore, the previous car of zero butane you shipped us either had a lot of gasoline, pentane, or water in it because it won't vaporize."

There are so many factors that cause complaints of this type that the difficulties encountered must be analyzed separately. First, let us analyze what happens to the contents of a buried storage tank when fueled and refueled with a mixture of 70% butane and 30% propane, which has a pressure of 40 lbs. at 60° F., with respect to the mixture ratio and thermal value of the gas, when the tank is full according to code, when it is two-thirds full, and when it is one-third

full, and then is refueled six times. (See Table 1.)

At the start, the tank was filled with a 70% butane—30% propane mixture. This fuel has a heat value of 2765 B.t.u. per cu. ft. and a boiling point of –2° F. When the vapor has been drawn off to a point where the tank is two-thirds full, the 70-30 mixture is now an 82-18 mixture. The thermal value of the fuel has increased from 2765 B.t.u. per cu. ft. to 2910 B.t.u. per cu. ft., or 4% more. The boiling point has raised from –2° F. to 18° F.

When Tank Is One-Third Full

When the vapor has been drawn off to a point where the tank is one-third full, the 70-30 original is now a 96-4 mixture, or 96% butane and 4% propane, and the thermal value of the fuel is now 3155 B.t.u. per cu. ft., or 10% more. The boiling point has raised from –2° F. of a 70-30 mixture to 27° F. of this final mixture.

If the ground around the tank is 32° F. and the take-off of the fuel being utilized is excessive, the pressure gage on the tank will show practically no pressure when the slip tube gage shows the tank one-third full. Yet, this fuel was a 70-30 mixture when the tank was filled initially.

Now, assume that the distributor of fuel refills the buried tank not with a "shot" of fuel, but actually refills the tank in accordance with code filling. The original one-third of the fuel of 96-4 mix, plus the refueled two-thirds of 70-30 mix, is now approximately 79-21 mix, that is, the tank after being refueled once with 70-30 mixture contains a total mixture of approximately 79 parts of butane and 21 parts of propane, even though a 70-30 supply of fuel was added to the tank from the tank truck. Note that the propane content is now almost 9% less than initially and the boiling point is now 5.8° F. The thermal value of the fuel is now 2852 B.t.u., or 3% more than the initial fuel. Again going through a draw-off cycle of the vapor after the tank has been refueled and when the refueled tank is two-thirds full of liquid, the mixture is now approximately 90-10, or 90% butane and 10% propane. It is important to note that this tank upon refueling with a 70-30 mix now has a mixture of 90-10 after one-third of the vapor has been drawn off, leaving two-thirds of the liquid mixture content. The thermal value of this fuel at this point is 3008 B.t.u. per cu. ft., or 9% more than the B.t.u. of the original mixture. The boiling point has been raised from –2° F. initially to approximately 17° F. at a point two-thirds full upon one refueling.

Withdrawals Lower Temperature

When the vapor has been withdrawn to a point where the tank is only one-third full, the mixture after refueling is now 97-3, or 97% butane and 3% propane, or practically straight commercial butane. Again if the vapor being utilized is being drawn off in excessive quantities, refrigeration of the liquid takes place and a temperature of 32° F. is easily realized, and there will be no gas pressure and the customer complains of

TABLE 1. COMPOSITION AND PROPERTIES OF AN ORIGINAL MIXTURE OF 70% BUTANE AND 30% PROPANE AFTER CONSECUTIVE FILLINGS WHEN 1/3 FULL—DATA GIVEN FOR EACH FILLING WITH TANK FULL, 2/3 FULL AND 1/3 FULL

Number Times Tank Refilled*	Full				2/3 FULL				1/3 FULL				Maxium Variation In Volume Air Required for Complete Combustion
	Composition (Per Cent) Butane	Propane	Thermal Value B.T.U. Per Cu. Ft.	Boiling Point °F.	Composition (Per Cent) Butane	Propane	Thermal Value B.T.U. Per Cu. Ft.	Boiling Point °F.	Composition (Per Cent) Butane	Propane	Thermal Value B.T.U. Per Cu. Ft.	Boiling Point °F.	
Start.....	70	30	2765	2	82	18	2910	10	96	4	3155	27	27 to 31
First.....	78.67	21.33	2852	5.8	89.8	10.2	3008	16.9	97.34	2.66	3207	30	28 to 31.5
Second.....	79.11	20.89	2856	6.2	90.2	9.8	3015	17.3	97.82	2.18	3209	30.1	28 to 31.5
Third.....	79.27	20.73	2858	6.3	90.3	9.7	3016	17.4	97.85	2.15	3210	30.2	28 to 31.5
Fourth.....	79.28	27.72	2858	6.3	90.3	9.7	3017	17.5	97.86	2.14	3211	30.2	28 to 31.5
Fifth.....	79.28	20.72	2858	6.3	90.3	9.7	3017	17.5	97.86	2.14	3211	30.2	28 to 31.5
(Infinite)...	80	20	2865	7	91	9	3025	18	98	2	3215	30.5	28.5 to 31.5

*Tank refilled when 2/3 empty (1/3 full).

no gas, even though the slip tube gage or float gage shows the tank to be one-third full.

The distributor upon receiving this information from his service man or from the customer assumes he has received a bad load of fuel. These are actual facts and I hope you will accept them because unless they are realized and a means to prevent this condition next winter is taken, you will have a recurrence of the same service grief you had last winter.

Refills Bring Changes

When the distributor refills the tank to code filling the second, third, fourth, fifth and sixth time, each successive filling with a 70-30 mix will result in approximately an 80-20 mix when the tank is full. At this time only will the fuel be an 80-20 mix. Thus, a 70-30 mix used in repeatedly refueling an underground storage tank has a boiling point of 7° F. or 9% higher than the initial filling, and the thermal value of the repeatedly refueled tank will eventually settle at 2865 B.t.u. per cu. ft., or 3½% more than the original B.t.u. value of a 70-30 mix. This variation in B.t.u. and rise in boiling point are not objectionable.

Another factor affecting the number of service calls and complaints during cold weather is the effect of change in the calorific value of the vaporized fuel on connected gas appliances. If the appliance is set during summer months and straight butane is used in the buried tank, 31.5 parts of air are required to burn one part of the vaporized butane. This is also true if the underground storage tank is one-third full, because the fuel content at this level in the tank is practically straight butane. If this appliance is a heating appliance and the fuel delivered during the winter months is a 70-30 mix, the air required for good combustion is now 28 parts to one part of vaporized gas. Because both butane and propane are slow burning fuels, there is a tendency for the air-gas mixture to blow up through the ports of the gas burner, or as we say, to float away or leave the gas burner, resulting in unburned gas accumulating in the room, and the customer complains of an odor of gas on his premises. The customer calls the distributor about the odor and the distributor's service man is sent to find the leak, assuming that an odor is a sign of a gas leak. The service man cannot find a gas leak in this instance and he reports back to the distributor that the gas has too much malodorant added by the supplier. The distributor writes to the supplier complaining of a bad odor in the last car of fuel.

Fuel Changing Is Serious Problem

We know that it is not economically possible to have service men call on all customers and readjust appliances when winter fuel is added to the customer's underground tank. Besides, no one person can tell when to readjust appliances for a varying calorific value of the fuel because the change in B.t.u. per cu. ft. of butane to which a mixture has been added is gradual and is not instantaneous. It is my firm opinion that the practice of using two different fuels, namely, butane in summer months and butane-propane

mix in winter months, is just as serious a problem to be remedied as the problem of vaporization during extreme winter weather.

I have tried to review my personal experiences in assisting in the service work of distributors we serve in relating conditions as I have found them during the past three years. So far, I haven't made any suggestions to remedy these existing difficulties, and again these remedies, which are my own opinion, are based on these complaints.

Remedies for Excess Service

The following remedies will aid in eliminating the burden of excessive service calls and gas failures and they are given for your consideration:

1. Use extreme care in burying tanks at least two feet below the frost line.

2. Use extreme care in selecting size of tank with respect to the connected gas load that you expect to put on this tank as you sell your customer more appliances.

3. Adopt a scale of underground storage tank sizes with respect to a definite load in cubic feet per hour, depending upon the climatic conditions in your territory.

4. It is important to keep tanks more than 50% full at all times during extreme cold weather. Remember that a tank one-half full has only 50% of the outside surface of the shell as an effective medium to absorb heat from the ground. Thus, you have reduced the heat absorbing efficiency approximately 50% of your buried underground tank because it is a very small amount of heat that is transferred from the storage tank to the vapor space to the liquid. (I have had distributors tell me that it is not possible to constantly refill the customer's tank during extreme weather as he will not pay for fuel on bills rendered when he knows that his tank is not empty. Unless you change this customer relation problem, you will have the same recurrence of grief next winter.)

5. During extreme cold weather, do not have service man with tank wagon make a dozen calls and give each underground storage tank a "shot" of fuel because this relief by increasing the vapor pressure is only temporary. The customer's storage tank should be filled to the maximum code limits for that tank.

6. Adopt a mixed fuel, preferably a 70-30 mix, for year around operation. In the case of Class "A" storage tanks which have a working pressure at 80 lbs./sq. in., according to present code you cannot use a 70-30 mix. However, with tanks that are available today, having a working pressure of 103 lbs./sq. in., it is safe and satisfactory to use a 70-30 mix for general purposes. A 70-30 mix will give you a fairly uniform fuel in severe weather, again providing the tank is kept more than half full.

7. Adopting a standard mixed fuel for year around operation will reduce the service cost of adjusting appliances and once they are set in summer months they will burn the same mixture in winter months in severe cold weather if the tanks are kept more than half full.

8. Let us consider for a moment a gasoline stove. Gasoline has a vapor pressure of from 6 to 10 lbs. per sq. in. gage at 100° F. Butane has a vapor pressure of approximately 38 lbs. at 100° F. To burn gasoline, we put air pressure on the liquid fuel in the storage tank and drive out the fuel as a liquid through the heat exchanger in the flame. There the fuel is vaporized, generated and supplied to the burner.

There is one gas utility that has been doing this very thing for years, handling straight butane. This public utility has solved the problem in regard to the vaporization of liquid fuel by means of a heat-transferring heat exchanger. This unit uses a gas burner in the heat exchanger similar to the burner in a gas refrigerator. It has a bi-metallic safety pilot, which is satisfactory. The use of this liquid heat exchanger assures a constant B.t.u. fuel

and a sufficient capacity of gas in vapor form to be utilized, regardless of connected load. The vapor pressure in the storage tank is maintained within constant limits, regardless of atmospheric weather conditions. In the opinion of many, this system is too elaborate and has too many gadgets to adjust and service. In the opinion of the owners of these units, the units are highly satisfactory, are efficient, and a gas rate is offered to their consumers that allows for a service charge to maintain these units.

Heat Exchanger Is Needed

The only method I know of to combat cold is with heat. Thus, if you are going to use fuel that has no gas pressure at 32° F., unless you use heat, you will have a recurrence of last year's service work. In order to get heat to this fuel during cold weather, a liquid heat exchanger which has a medium of transferring heat will have to be used. The location of the heat exchanger is not important. It can be in the buried tank, adjacent to the tank, between the tank and the house utilizing gas, or heat exchangers of definite size can be installed in the house according to Pamphlet No. 58 of the National Board of Fire Underwriters. The capacity of this heat exchanger installed inside of the house can be increased if relief valves are mounted on the same in accordance with code specifications. Thus, heat exchangers, in my opinion, are the major improvement to be recommended at this time and their use will eliminate gas pressure failures and the tank can be practically emptied before refueling during extreme weather. Further, the calorific value of any mixture will remain constant until the tank contents are emptied.

It will probably require two more years of gas failures to convince a great many people in this industry that heat exchangers are the answer to this question.

9. If heat exchangers are not to be used, then propane should be the fuel used in these large consumer tanks, and if it is used the tank does not need a heat exchanger for most installations. If propane is being used, the tank does not need to be buried. The cost of storage tanks today for propane in certain sizes is practically the same as the cost of butane storage tanks to be buried.

10. The consideration of propane for replacing butane does not aid in the servicing of existing butane installations. A change in the market value of butane, which is uncertain with some suppliers because of its value as gasoline, may make propane a cheaper fuel in the very near future.

A subject that has no relation to generation of butane vapor, but should be considered here, is the matter of condensation in gas supply lines from the storage tank to the customer's appliance. By condensation, I mean the changing of the gas from a vapor back to a liquid which causes a stoppage in the gas lines due to a pocket or trap filling with liquid and interrupting the gas service. If butane is used, and the gas supply lines are exposed to outside atmospheric temperatures of 32° F. and the gas pressure is as it should be (11 to 12 in. of water column), this being practically atmospheric pressure, it is perfectly natural for butane to condense from a vapor to a liquid, blocking the passage of vapor to the customer's appliance.

When Condensation Occurs

If a mixture of butane-propane is used, under the same conditions, the butane will leave the vapor mixture and condense as butane liquid. If there is a rise from the low point of the gas supply line between the storage tank and the connected appliance of 22 to 24 in., and this height fills with butane, it will equal the 11 to 12 in. of water column at which the gas pressure regulator has been set.

The remedy for this condition is:

1. To put in drip pockets to accumulate liquid butane if it cannot be drained back to the storage tank.

2. To pitch all gas supply piping back to the storage tank so that it cannot accumulate in the gas supply line. If it is not possible to get these condensed vapors back into the storage tank, a drip pocket must be placed in the ground adjacent to the buried underground tank.

When low pressure piping from buried tank is installed horizontally underneath a building, exposed to atmospheric temperature, it is a waste of time and money to insulate or cover these fuel supply lines. If this low pressure line is buried in the ground and short vertical risers are made from the ground up through the floor of the building, these risers should be insulated or wrapped to prevent condensation.

Get Copy of Piping Code

It should be remembered that we are all in a public utility industry. If you do not have a copy of the gas piping code, by all means write for a copy at once. This code covers drip pockets in gas lines. All public utilities that manufacture gas provide pitch to all pipes to prevent an accumulation of condensed vapors. Any faulty piping installations can be changed inexpensively and should be done at once.

I know that some of you are saying, "We cannot provide heat exchangers, provide drip pockets, change piping, etc., because of the low price at which we have to sell our fuel." My only answer to this servicing problem is that all major public utilities have in their cost set-up a nominal service charge which is added to the cost of the customer's fuel. Again, you are in this same business and before long you will have to do likewise. By this, I mean that most of you are not getting enough money for your fuel and at the price it is being sold you do not have sufficient allowance for the minimum service calls of your customers.

Let me recommend that you read the excellent paper of E. W. Evans, appearing in the July-August, 1939, edition of the Liquefied Petroleum Gas Association's magazine, *Jet*. In this paper you will find that Mr. Evans has technically analyzed the batch vaporization of various mixtures of butane and propane.

In conclusion, tighten up on the supervision of your gas plant installations. See that they are installed properly and in accordance with good installation practice for safety's sake in preventing hazardous installations, and to help reduce your servicing costs of these installations.

◆ ◆

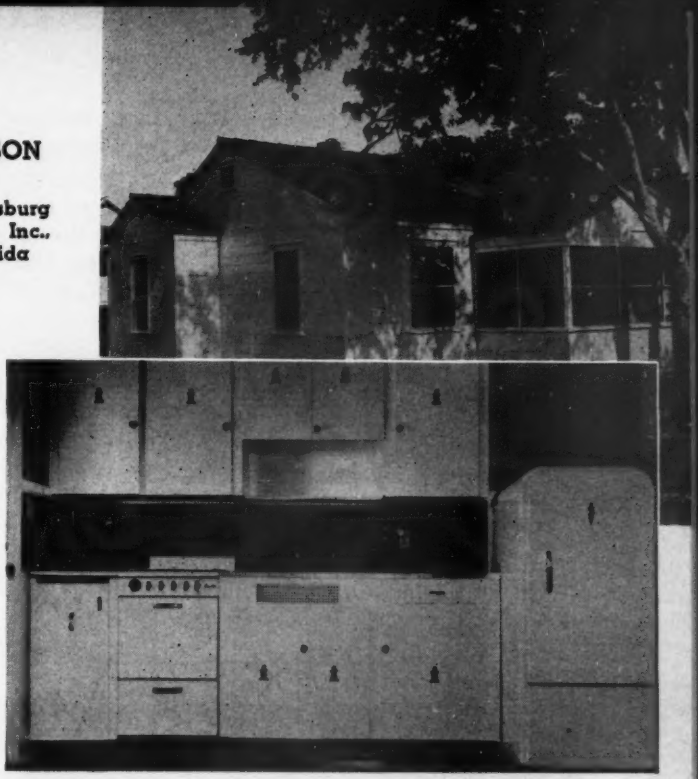
Annual Meeting Midwest Section Will Open in Omaha, Sept. 30

The annual Fall meeting of the Midwest Section of the Liquefied Petroleum Gas Association will be held in Omaha, Neb., Sept. 30 and Oct. 1, under the chairmanship of Charles O. Russell, of the Thermogas Co., Des Moines, Iowa. Other officers of the Midwest Section are N. A. Evans, Pressed Steel Tank Co., Milwaukee, vice president, and Harris A. Goodwin, The Bastian-Blessing Co., Chicago, secretary. Headquarters will be at the Fontenelle hotel.

The program committee, headed by Francis McCahill, Home Gas Co., Minneapolis, has arranged for papers covering merchandising, advertising, distribution, accounting analysis, storing and handling LPG and other technical subjects.

By C. R. ANDERSON

Treasurer, St. Petersburg Gas Appliance Co., Inc., St. Petersburg, Florida



The "package" form of selling LPG appliances worked perfectly in equipping this new modern home of W. J. Stoddard at Gulfport, Fla.

"Package Selling" to New Homes Puts Competition to Rout

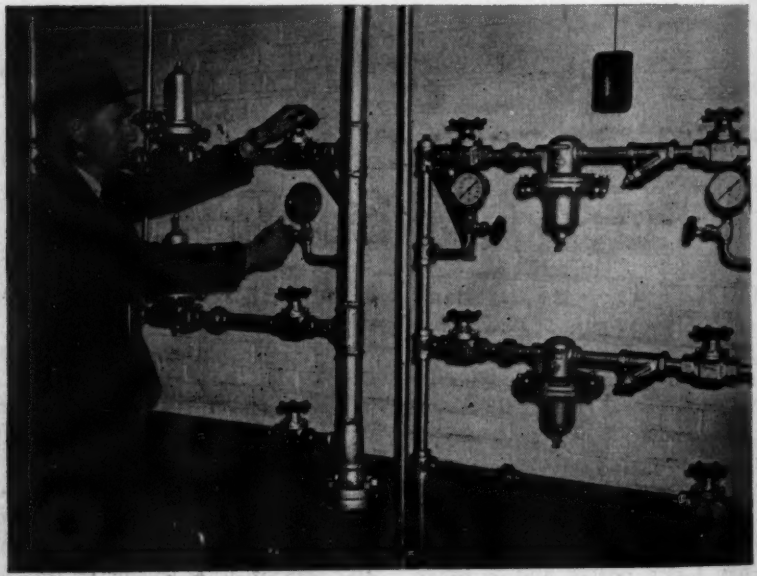
ILLUSTRATIVE of the importance of canvassing owners of new homes and presenting to them the economy and serviceability of liquefied petroleum gas for general household uses, is a recent installation made by the St. Petersburg Gas Appliance Co., Inc., of St. Petersburg, Fla. In competition with other fuels, we placed a Servel Electrolux gas refrigerator, a Ruud table-top water heater and a Magic Chef range in the home of W. J. Stoddard at Gulfport, Fla., a suburb of St. Petersburg, situated on Boca Ciega Bay, adjacent to the Gulf of Mexico. Green's Fuel, a LPG product blended by the Standard Oil Co., is used for fuel. Thus we made five sales in one—three appliances, a fuel tank and the fuel, itself.

E. S. Lanning, president of our company, has established a practice of canvassing all new home owners and believes it to be one of the most profitable and effective methods of obtaining new business. Some kind of

fuel must always be provided, of course, and the appliances best suited for the fuel, as well. Either the contractor or owner can be presented with a sales plan and cost estimate that permits of easy comparison with other types of service. Then, by showing them other installations and revealing the comparative costs, which so greatly favor LPG, it has been found that prospects can be successfully sold in a high percentage of cases. When financing is necessary, it is an important advantage to the customer to be able to group them in one contract and to deal with one firm only.

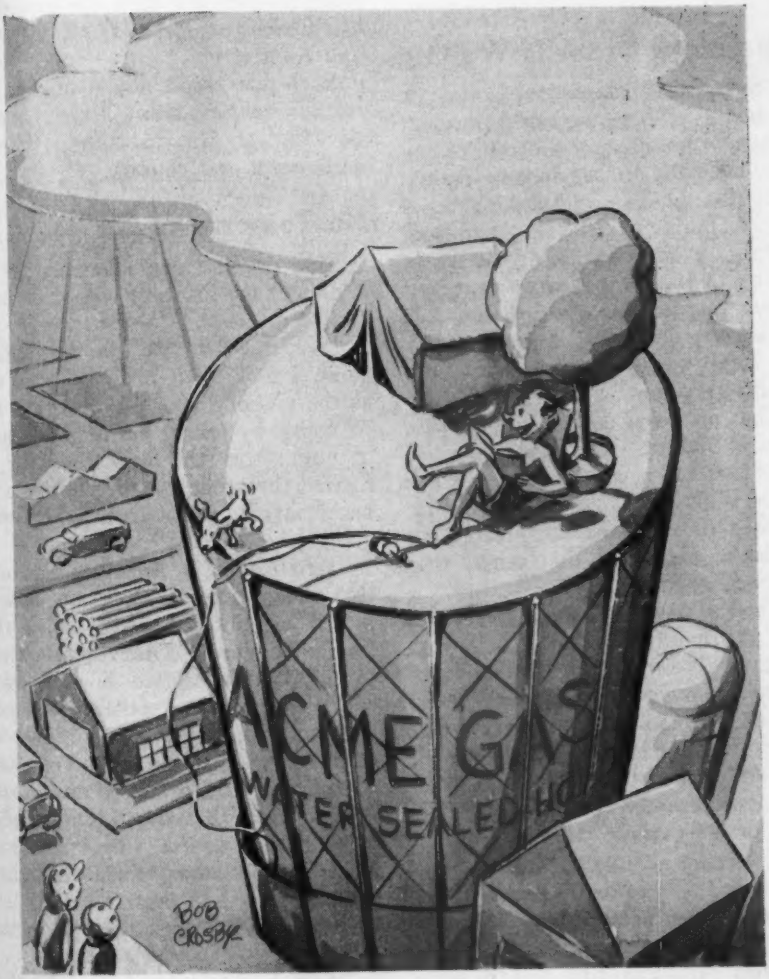
We usually do more than a straight selling job. We like to establish confidence through acquaintance and frank discussions of fuel problems. Then, wherever possible, we obtain the plan of the kitchen arrangement, and later present a sketch with range, refrigerator and water heater placed most advantageously. It is at that time we endeavor to get a signed contract, and usually do.

In addition to the appliances named, we handle Clow Gasteam radiators, Mueller and Peerless gas floor furnaces, Humphrey Radiantfire heaters, and heavy-duty hotel and restaurant equipment. Our installations embrace all types of construction, including residences, restaurants, hotels, tourist camps, apartment houses and others.



First stage vapor pressure regulators, at left; liquid regulators, at right, in Ogdensburg, N. Y., plant of Central New York Power Corp.

DOTTED LINE ROSCOE . . . by Bob Crosby



"It's Dotted Line Roscoe. . . . He's on a vacation this month. . . . "

SELLING

One More Order Is Waiting

"So much to do—so little time to do it in." Those were the words of a man with a dream—a dream of empire. He made of that dream a reality.

In the brief span of his life—a barely audible tick in the great clock of time—a large section of the southern tip of the great African continent became, under his willful direction, a thickly populated British province giving life, sustenance, security and wealth to millions.

That man was John Cecil Rhodes, empire builder. His vision was so great that he knew he could never live to see it realized. So, he worked feverishly to overcome the greater obstacles to his dream that others who followed might carry on.

Rhodes was typical of the great men the world has given us in that all have despaired of the few brief hours in a day. Almost every history of our geniuses closes with a statement of their unfinished works. Each one, as if with his eye on the clock and a preconceived knowledge of the time of his passing, worked feverishly to accomplish just one more thing.

Perhaps we ordinary mortals could not stand such pressure and drive. At least, we would be deprived of many of life's pleasures and joys if some time were not allotted for relaxation and recreation.

Yet, when realizing the energetic and determined effort of these great men, we should hang our heads in shame at the thought that out there is one more modern gas range, refrigerator, or automatic gas water heater order waiting for us if we give only a few minutes more to our day's work and go after it.

Such sales, especially if made after regular working hours, have the added value of firing a man with new enthusiasm and courage.

No Tomorrows Go

Here is what one salesman has to say about the prospect who says she'll "buy tomorrow:"

"When I first got into the selling game, I took what prospects told me as the gospel. If a prospect put me off today by telling me he was going to buy before the month was up, I figured the order was in the bag and began making plans about how I was going to spend the commission.

"After while I began to find out that these promised orders somehow just faded into thin air when the time rolled around for the prospect to sign on the dotted line. And I began to find out another thing too: prospects were just as apt as not to give my competitor an order even though they had promised one to me. I discovered that the salesmen who were getting orders from my prospects were showing them that they couldn't afford to put off buying until tomorrow or until the end of the month.

"And so I got busy and learned how to do that trick myself. If a woman started to tell me she couldn't possibly afford to buy an appliance

until such and such a time, I got busy right then and there and showed her how easy it was for her to buy on the savings made possible by using new appliances. Instead of having a prospect tell me, 'Goodbye now,' I kept insisting 'Buy now,' and I found it works.

Ask 'Em To Buy

"I've never been asked to buy," exclaimed a housewife once when asked why she had never replaced her ancient gas stove with a modern gas range.

Please note that the prospect did not say, "I've never been called on!" There is a vast difference in "calling on a housewife" and in "asking her to buy." Merely to call in and to tell of the wonders of a gas appliance are not always enough. It is a trait of the human mind to resist making decisions.

And one or even two such attempts to get an order is seldom enough. This fact is especially true of our selling problem. We are asking a person to buy a thing she needs, but she may not realize the need; or, realizing it, she may feel that the expenditure is not justified at this time. Thus, aside from the natural tendency to avoid making decisions, there is often real reason as the buyer herself sees it to resist, and sometimes stubbornly, your salesmanship.

Moreover, after the decision is made, unless you urge the housewife to immediate action, the same forces that caused her to hesitate in the beginning will become effective again and the job will have to be done all over at a later time.

Sell the Sizzle

One of the country's most successful sales psychologists has made an intensive study of the questions salesmen ask. He has cataloged over 14,000,000 of them.

From his diagnosis of these questions he has arrived at this motto: "Don't sell the steak, sell the sizzle." Don't ask them "How many?"—ask them "Which?" Follow this rule, he says, and the "no" is taken out of selling. As illustrations he cites the following examples:

A soda jerker sold three large glasses out of every five customers who ordered Coca-Cola by the question: "Large one?"

Statler Hotel room clerks rented more higher-priced rooms by saying: "From $6.00 down," rather than "From $3.50 up."

A hosiery saleswoman sold three times as many stockings by asking: "Three pair?"

A shirt salesman sold a carload by the simple statement: "These buttons are *anchored* on."

Square clothespins sold over round ones by the remark: "They don't roll."

The words you use in selling LPG can be highly influential in making successful sales for you. The choice of the right words to the right prospects will always result in a "yes" answer. Think over your sales presentation. Study your prospects carefully. Don't ever leave yourself open to "no." "Don't sell the steak—sell the sizzle!"—*Reprinted from sales letter of Philgas Department, Phillips Petroleum Co.*

You'll see no sleepy-heads in this rural class—and for good reason. The school board has chosen

Butane for Healthful Heating

By CRAIG ESPY

THE 328 pupils of Avalon Independent School, Avalon, Texas, have been warmed with butane heat for the four past winters. So successful has the heating job been that after the third year when the school authorities arranged to heat the new gymnasium they turned to the same fuel and to the same type of heating equipment.

The school building proper, which has the equivalent in floor space of 14 class rooms, is heated with 37 Clow Gasteam radiators, with six additional radiators of the same make being utilized in the new gymnasium. A 1000-gal. butane plant serves fuel to the school and a separate plant has been installed for the gymnasium. In addition to the heating job the gymnasium utilizes butane for a large storage type water heater which provides the hot water for baths. A home economics room is maintained in the school. Several gas ranges, as well as a hot water heater, operates from butane in the home economics room. The plants are served by Liquigas Co., of Italy, Texas.

Superintendent of the school, J. P. Griffith, has stated that his gas consumption for the 1939-1940 term of school was $225.46. This figure he compared with more than $400 which he says he had previously spent for coal each year. Now, his building doesn't need to be redecorated as it frequently did when coal was used. The present heat is asserted to be far healthier for the pupils, and its dis-

tribution throughout every room is very uniform. Because of this there have been fewer absentees from school due to colds and sickness since the butane heat has been installed. In addition, butane heat also saves money in repair bills, for it costs approximately $100 per year in average sized schools to repair stoves and keep coal-burning equipment in good condition. Then add noise and coal dust.

The school buildings also serve as the community center of the district. As a rule weekly functions are held in the school building. These range from card parties to school and community meetings.

A past president of the school board has installed butane in his home, following the success of the application in the school. He installed the same make of radiator as used in the school, with an additional space heater or two.

The school building has been constructed of walls 13-in. brick and tile, plastered. The floors are wood, the ceiling celotex. The cubic contents are 94,200 cu. ft. Glass and doors exposed total 1570 sq. ft.; walls exposed, net 5390 sq. ft.; floor space, 9420 sq. ft.; degree days, 2566.

The radiation installed in the school building is 2792 sq. ft. steam radiation, and that in the gymnasium is 870 sq. ft. steam radiation.

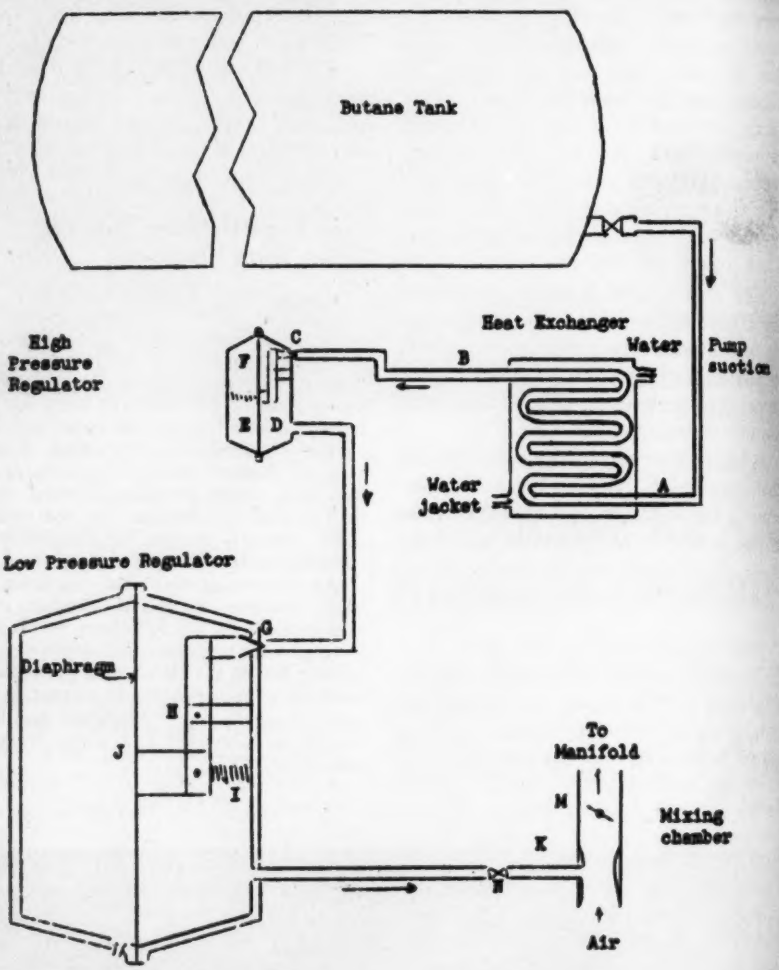
◆ ◆

Fire Reports Show Gas Far Safer Than Electricity

The United States will observe Fire Prevention Week this year during the week of October 6-12. Industry as a whole has contributed more to the success of these annual observances than any other class in our national economy and it has benefited proportionately, according to the National Fire Protection Association, of Boston, Mass., which states further that under present industrial conditions, with production on the upward curve, there is a need for tightening our defenses against fire.

An interesting fact that the latest statistics compiled by the Association reveal is that while 70,500 fires have been caused by electricity and electrical appliances and motors during the last annual period, there have been only 4000 fires caused by gas and gas appliances. Electrical fire losses totaled $25,200,000 and those from gas but $800,000.

In this modern school, 328 Avalon, Texas, pupils enjoy the comforts and benefits of butane for heating. There are 43 gas radiators in use.



A—Inlet to heat exchanger
B—Butane outlet
C—Control needle valve
D—Control arm
E—Coil spring
F—Diaphragm
G—Control needle valve
H—Control arm
I—Coil spring
J—Diaphragm
K—Fuel nozzle
L—Venturi throat
M—Throttle valve
N—Mixture control valve

FIG. 1. BUTANE FUEL SYSTEM

A Hefty Fuel For Heavy Hauling

BUTANE is a liquefied petroleum gas produced in such a manner that it is adapted for use as a fuel in internal combustion engines. It is too volatile to mix with regular gasoline and too condensable to use in ordinary city gas lines, although in especially designed pipe systems it is successfully distributed, both straight and mixed with air, for domestic and commercial use. Unless other compounds are added, it is a colorless, odorless, non-poisonous and non-corrosive compound. Following are the approximate physical properties of butane fuel. The constituents of commercial butane and approximate percentage of each are: Ethane 0 to .5%; propane 10 to 15%; iso-butane 20 to 40%; normal butane 50 to 80%; and a trace of iso-pentane. It is transported and stored as a liquid under pressure but is burned in an engine as a true gas.

KENNETH R. FROST

The properties of butane make it an ideal fuel for engines, owing to its readiness to vaporize and form a gas which can be uniformly mixed with air without the danger of condensation. In addition to producing heat in the engine cylinder with minimum combustion loss, butane does not cause dilution in the crankcase nor formation of carbon in the cylinders. Butane also has the highest octane rating of any fuel ordinarily available on the market (100 +) enabling the engine to operate at higher compression ratios and higher efficiencies. It has a tendency to burn rather than explode in the engine, due to its slow rate of flame propagation. (See Table No. 1.)

● **KENNETH R. FROST, instructor in Agricultural Engineering, Department of Agriculture, of the Modesto Junior College, Modesto, Calif., in a paper entitled, "Butane Fuel for Farm Use," the facts of which constituted the basis for an address given before the Eleventh Annual Farm Machinery Conference, held on the campus of the University of California Agricultural College, at Davis, Calif., Jan. 12, 1940.—(Abstract by BUTANE-PROPANE *News*.)**

Equipment for Butane. Additional equipment must be purchased when butane replaces other fuels for internal combustion engines.

It is carried in the tank as a liquid under pressure higher than atmospheric. To withstand these pressures the tanks, fuel lines, etc., are made of high quality material. Storage tanks, portable tanks and engine fuel tanks are usually made of welded steel 3/16 in. to ¼ in. thick and cylindrical in shape with spherical ends. Proper fittings for these tanks for filling, emptying, etc., are placed at the top of the cylinder or at the end and

guarded to prevent damaging. Between the tank and carburetor the butane must be changed from a liquid to a gas and heat is absorbed during the conversion. The device used to supply this heat is called a "heat exchanger." Pressure regulators using diaphragms and control valves serve to reduce the pressure after it has passed through the heat exchanger.

Engine Fuel Tanks. In a standard fuel tank the butane is forced out by vapor pressure in the tank through an outlet near the bottom or from a tube connected to an outlet at the top and extending to the bottom. This method will always supply liquid and not vapor to the fuel system, which is desirable for engine fuel supply. Removal from the bottom of the tank prevents separation of the various ingredients (ethane, propane, butane) and avoids cooling of the fuel tank. Diaphragm type valves are preferred to other valves for butane tanks as they need no packing; therefore, leaks are less probable. Fuel lines connecting the tank to the heat exchanger are copper tubes with a link of flexible hose to absorb the vibration of the engine.

TABLE NO. 1

Vapor pressure in lbs./sq. in. gage	*Temp. °F.*
0	12
28-46	60
34-54	70
55-85	100
60-92	105
86-128	130

Boiling point at atmospheric pressure	12°-33° F.
Weight per gal.	4.8 lbs.
Lbs. per cu. ft. (twice that of air)	0.15
B.t.u. per cu. ft. of gas (Heat Units)	3200
B.t.u. per gal. of liquid	100,000
B.t.u. per lb. of liquid	21,000
Expansion ratio liquid to gas	240
Upper limit of inflammability, % gas to air	6.6
Lower limit of inflammability, % gas to air	2.0
Octane rating	100

Fuel tanks must be rigidly fastened to the base upon which they are mounted so that they will withstand a force not less than four times the weight of the tank when filled. Additional braces and rods may be necessary to hold the butane fuel tank when it replaces a gasoline tank.

Butane tanks must be equipped with a safety valve to prevent bursting due to excessive pressure should the tank be filled to more than 90% of its total capacity or be subjected to excessive temperatures. One manufacturer builds a two-compartment tank so constructed that only one compartment can be filled with liquid, leaving the other smaller compartment (about 10% of the total tank volume) for gas or vapor space.

A pressure gage and liquid level gage are desirable but not essential accessories. The liquid level gage is mounted at the end of the tank and consists of a bent pipe and valve. The pipe may be rotated until it reaches a point where liquid does not flow from the valve when it is opened, thus showing the level of the liquid. A pointer connected to the pipe and a dial indicate the quantity

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of the fuel in the tank. Five connections are necessary for butane fuel tanks. They are: (1) Opening for equalizing pressure in fuel tank and delivery tank; (2) Hose connection for filling tank with liquid; (3) Liquid line to heat exchanger; (4) Vapor connection to carburetor for starting engine; and (5) Maximum liquid level gage.

Heat Exchangers. Heat is supplied to vaporize the fuel by circulating engine cooling water around coils containing butane liquid. The temperature of the cooling water should be maintained at about 165° F. by thermostats to give uniform results. Exhaust type heat exchangers have been used for vaporizing butane but are not recommended, owing to the constantly changing exhaust temperatures and engine loads. A diagram of a heat exchanger is shown in Fig. 1.

Pressure Regulators. Two regulators are usually necessary to reduce the gas pressure to that required at the mixing chamber. A high pressure device for partially reducing the pressure and a low pressure device to give extremely low pressure at the manifold are used. Both regulators are shown in Fig. 1. The high pressure regulator operates at pressures well above that of the atmosphere while the low pressure regulator functions only when the suction of the engine lowers the pressure below that of the atmosphere. The diaphragms and control valves in each regulator are properly balanced by spring tension so that the pressure is automatically regulated when the engine creates a partial vacuum in the interior part of the intake manifold.

Mixing Chamber. The original carburetor on the engine may be used as a mixing device in some instances by connecting the butane gas line from the regulator into the carburetor throat at the Venturi tube. In this case the gasoline supply is shut off when butane is burned in the engine. However, there are special butane carburetors on the market which function better than the original gasoline carburetor as they have compensating features for controlling the mixture of air and fuel at various loads and speeds.

How a Butane Fuel System Functions. A complete diagram of a butane fuel system is shown in Fig. 1. Liquid fuel passes from the butane tank into the heat exchanger at A and out at B. Engine cooling water heats the liquid forming a vapor which enters the high pressure regulator at C. The spring E holds the needle valve open when the pressure at D is lowered by the suction of the engine. The spring E and area of the diaphragm F are balanced to control needle valve C so that the pressure at D is maintained at a predetermined point. The gas flows under this pressure through a line to needle valve G in the low pressure regulator which is opened by the suction of the engine acting against the diaphragm J and compressing spring I. The area of the diaphragm J and tension of the spring I are such as to allow only sufficient gas to enter at G to give the proper pressure at the nozzle K for mixing the gas with the air. Cranking of the engine, opening of the throttle valve M and the momentar-

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TABLE NO. 2

Compression Ratio	Max. Brake H. P.	% Increase in Br. H. P.	Fuel Consumption Per B.H.P. per Hr.		% Decrease in Fuel Consumption
			pounds	gallons	
4.38 – 1	66.5		.619	.129	
4.85 – 1	76.5	13.5	.583	.121	4.2
6.75 – 1	87.0	30.9	.512	.107	17.3
8.57 – 1	96.0	44.4	.499	.104	19.4

ily closed air inlet cause the butane system to start functioning. When the engine is stopped the regulator valves close, preventing the flow of gas to the manifold and affording a positive shut-off.

Engine Changes. To obtain the best results from the use of butane as a fuel for power units, it is desirable to increase the engine compression ratio to 7 to 1 at low altitudes and higher ratios (possibly 8 to 1) at high altitudes. The high octane rating of the fuel allows the use of this high compression ratio without fuel knock and results in lower fuel consumption, cooler engines and better engine performance. Compression ratios may be increased by using "high altitude" pistons, high compression heads or planing off the engine head or the engine block.

In general, it may be stated that 8 to 1 is about the maximum compression ratio possible with existing engines. Permissible compression ratio is, however, largely dependent upon engine design and should not be changed without consulting the manufacturer. In many cases the mechanical strength of the engine is not sufficient to permit continuous operation at the high pressures developed when butane is used as a fuel with too greatly increased compression ratios.

Table No. 2 shows the increase in efficiency found by one butane manufacturer by increasing the compression ratio.

It will be noticed that in the above table doubling the compression ratio increases the horsepower output 44.4% and decreases the fuel consumption 19.4%.

Increasing the compression ratio of the engine may require a higher voltage at the spark plug or the engine will misfire. Overhauling the magneto or ignition system will be necessary in that case and possibly if the ratio is increased greatly, a new type ignition system will have to be installed. "Cold" spark plugs with short porcelain are recommended for engines burning butane.

Too lean a fuel-air mixture will burn the inlet valves of the engine, resulting in frequent repairs. Mixtures should never be leaner than 17 to 1. In order to burn all of the fuel without leaving excess air the ideal mixture ratio for butane is 15.47 to 1 which is 0.5 part leaner than for gasoline.

Butane Storage and Transportation. Butane may be purchased at the refinery or obtained from one of the distributing companies. Tanks hold-

FORSTER TORCHES

For Every Purpose
For All Gases

Shown above is one of a large line of Forster Torches, available in a wide range of types and sizes, made for every conceivable purpose. Some throw small sharp flames for use in radiator and battery work—others throw large flames as required in pre-heating, weed burning, snow melting.

From large to small—we make them all—they're used in every garage, factory, foundry, laboratory, tin shop; by painters, plumbers, welders and mechanics. If you have butane, propane or natural gas available, you can use the torches illustrated in our new catalog. Write for our catalog and the name of your local distributor.

We are prepared to design and install industrial butane standby plants, public service gas plants, as well as automotive and stationary engine conversions. Your inquiries are solicited.

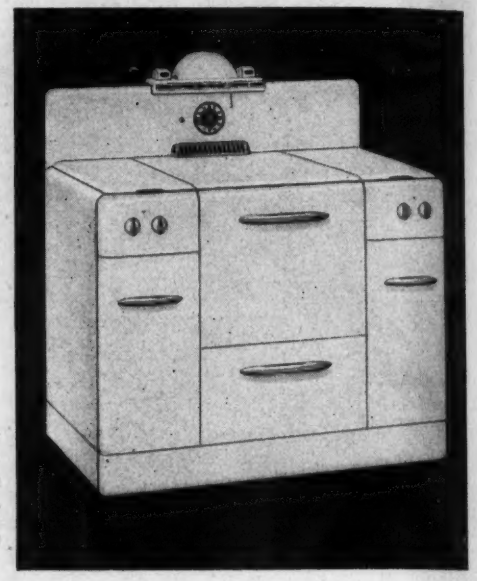
RANSOME COMPANY

Manufacturers of Forster Torches and Burners

4030 HOLLIS STREET **EMERYVILLE, CALIF.**

RANSOME

FLORENCE MEETS EVERY NEED IN THE BIG LPG MARKET!



You're *prepared* when you sell the Florence LPG line. For there is a Florence Gas Range to meet the need of *every* prospect who comes through your doors!

Florence builds outstanding de luxe ranges, like the balanced top model shown here . . . luxurious ranges with every modern feature . . . compact ranges that bring big-range cooking to smaller kitchens. Sell a line that meets the needs of *all* your customers—and their budgets, as well!

Florence gives you a famous name, sales help that really helps, and shares liberally in the cost of your own newspaper advertising. Mail the coupon to the nearest Florence office!

FLORENCE STOVE COMPANY

General Offices and Plant, Gardner, Mass.; *Western Offices and Plant,* Kankakee, Ill.; *Sales Offices:* 1458 Merchandise Mart, Chicago; 45 E. 17th Street, New York; 53 Alabama Street, S.W., Atlanta; 301 N. Market Street, Dallas; and 2730 16th Street, San Francisco.

FLORENCE *Gas Ranges*

FOR LIQUEFIED PETROLEUM GAS

FLORENCE STOVE COMPANY

Please send me the Florence Gas Range Catalog, prices, and full information about the liberal Florence Promotion Plan for Dealers.

*Name*_____

*Address*_____

ing 1000 to 1500 gallons are recommended for farms using butane for stationary engines, tractors and trucks.

Relief valves and fusible plugs are necessary on storage tanks to prevent high pressures bursting the tank as might be caused by high summer temperatures or accidental fires. Proper valves and fittings for filling fuel tanks or portable tanks are also necessary to reduce fire hazards. When the tank is filled an extra hose line is connected into the top of each tank to equalize the pressure. Fuel is pumped from one tank to another by a small manually operated positive pump through specially lined high pressure hose made for petroleum fuels. Fuel tanks may be filled by gravity from the supply tank if there is sufficient difference in elevation. Tanks should not be filled to more than 90% of their capacity.

Portable tanks for refueling tractors in the field must have skids welded to the bottom side. The skids prevent the tank from rolling and being damaged by mistreatment in the field. Fittings, fusible plugs, etc., for these tanks are the same as those used for storage and engine fuel tanks.

Results expected from the use of butane in internal combustion engines are: (1) Ten to 25% decrease in fuel consumption, (lbs. per hp. per hr.) and about the same as gasoline in gal. per hp. per hr. (2) Lower operating costs (25 to 50%). Due to difference in current prices. (3) Increase in engine power (10 to 25%). (4) No crankcase dilution. (5) Less repairs due to better lubrication. (6) Better engine performance. (7) Less carbon monoxide in exhaust gases. (8) Less carbon accumulation in combustion chambers.

Upon this group of go-getters in the service and delivery branches of the Verkamp Corp., Cincinnati, depends much of customer goodwill—and every man aims to keep it high!

Turning Salesmen Into Engineers

By O. D. HALL

SETUPS which make it easy for salesmen to determine the requirements for any domestic LPG installation are among the original ideas tried out successfully by L. L. Kessler, sales manager for the American Butane Gas Co., Oklahoma City, Okla.

Each setup is worked out for a certain number of rooms, and, taken in connection with the training given salesmen in heating engineering, American Butane Gas Co. representatives can truthfully call themselves engineers instead of mere salesmen. This training equipment, Mr. Kessler says, gives the representatives of his company a professional standing when they enter a home and impresses the prospect that they are ready and able to supply real LP gas service and not merely sell some equipment and appliances.

The prospect card idea has also been developed into a most useful aid to selling by this organization. Each salesman carries a supply of these cards upon which he enters all the pertinent and useful data in connection with each prospect upon whom he calls. These are turned in and discussed at the sales schools held under the direction of Mr. Kessler each weekday morning from 8 to 9 o'clock.

These cards are then filed in the office and prove very helpful in following up the prospect or when he comes into the office. The floor salesman can learn from this card just what was discussed with the prospective customer and can more easily close the sale. The salesmen who originally contacted the customer is given full credit for the sale if it is closed by another salesman or employe in the office.

"See that stove," says Mr. Kessler in a sales school session, pointing to a LPG space heater. "You get as

Carl Blore, J. P. Lowry and J. D. Smith, salesmen, listen to L. L. Kessler's instruction on heating problems.

DAY AND NIGHT

"HEATWAVE"

A Complete Line for the

L.P.G. INDUSTRY

Designed "from the ground up" to bring to the L.P.G. Industry the famous "Heat Trap" and other exclusive features which have made "Day & Night" Heating Appliances the standard of economy, efficiency and long life in the Gas Industry ... PLUS specially designed burners and controls to meet the specific requirements of Liquefied Petroleum Gases.

. . . . . and a line of Wall and PORTABLE HEATERS with the amazing LECTRO-GLO BURNER!

The LECTRO-GLO grid-and-burner design is utterly different in appearance and performance. It produces more heat than conventional open-flame burners, while it consumes less gas.

LECTRO-GLO HEATERS combine attractive appearance with maximum efficiency. Heat is radiated, reflected and circulated, warming the entire room uniformly. No fragile mantles to break or discolor. The Lectro-Glo patented stainless steel grid will maintain its efficiency for years.

LECTRO-GLO Heaters are available in two models—Wall and Portable. Both types are made in two sizes—single and twin-burner. Standard colors are Ivory, Walnut and White. Special colors to order.

WRITE FOR SPECIFICATIONS AND PRICES

"Heatwave" Water Heaters 3 Models

"Heatwave" Floor Furnaces 4 Sizes

"Heatwave" Console Heaters—3 Sizes

All with the Famous "HEAT TRAP"

DAY & NIGHT Manufacturing CO.

MONROVIA, CALIFORNIA

much heat from that stove as it puts out. Your prospect will absorb as much enthusiasm as you put into your sales talk."

After impressing upon the salesmen a fundamental principle announced and strictly adhered to by J. L. Grigsby, president of the company, that of selling only satisfactory service and standing back of that service long after the sales is made, Mr. Kessler says: "A man will not part with his money until he feels he is going to get more in return than he puts into the merchandise or product."

Individuality In Selling

No so-called "canned" sales talks are given out to employes. After giving some general instructions Mr. Kessler leaves the salesman free to use his own judgment and adapt his sales presentation to the immediate situation.

Some general rules, however, include: Do not ask the prospect at the start whether he has or wants propane or butane gas service. Even though you know he is beyond the natural gas mains, ask him if he has natural gas service. This is a natural gas country and every one with no gas wants it. Here you have a common ground for a favorable approach. Tell the housewife that living in the country or a town with no gas mains available need not bar her from the speedy, economical comfort and convenience of gas service. This in turn opens the way for you to explain that LP gas can do everything for her that natural gas can do and that she is entitled to all the modern conveniences of people along the natural gas mains.

Mr. Kessler admonishes his salesmen never to get down to a final sales presentation until he has husband and wife together, if he is dealing with a home installation prospect. If the salesman attempts to deal with one alone he invites a turn down through failure of one householder to adequately explain to the other the nature and convenience of the fuel. The sales representative, if the husband or the wife is not present, may safely go as far as the preliminary statements suggested above, and in addition he can measure the rooms and give the prospect an idea of what will be required to meet existing needs as he sees them. Up to this point he has presented nothing but the idea of bringing added comfort and convenience to the home and has left the impression that he knows what are the requirements of the prospect.

Let Prospect Have His Say

In the sales schools, salesmen are warned not to talk too much. "Let the prospect do some talking in reply to skillfully directed questions which invite him to state his needs and desires in connection with house heating and cooking," admonishes Mr. Kessler. He warns the salesman not to frame his questions so that a negative reply is easy. Always make statements or ask questions with which the prospect can agree. Thus much sales resistance is avoided. If the prospective customer says he cannot afford to install LP gas equipment and appliances, tell him about the easy F.H.A., or other financing plans, with a requirement of very small down payments and terms on balance arranged

Let these Gauges Prove Their Efficiency on Your L.P.G. Systems

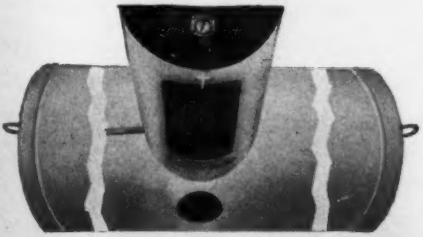
Rochester Criterion Gauges are especially designed and built for use in liquefied petroleum fuels and incorporate the famous Rochester magnetic principle of operation which assures greater accuracy and positive leak-proof construction. Listed as standard by Underwriters' Laboratories. Distributed by manufacturers of L. P. G. Systems.

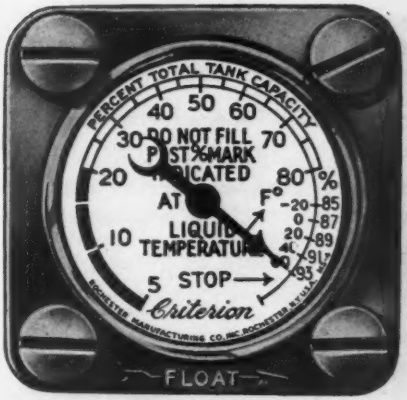
WRITE TODAY for complete information.

ROCHESTER MFG. CO., INC.

17 Rockwood St., Rochester, N. Y.

(Below) Rochester Criterion Gauge as installed in underground system of the DALLAS TANK & WELDING CO., DALLAS, TEXAS.





- **Permanent magnet pointer control—no packing glands.**
- **No opening through gauge head into tank.**
- **No fuel waste when in use.**
- **No keys or wrench required when reading.**
- **Easy-to-read dial tells ACCURATELY at-a-glance the amount of fuel in the tank in terms of percentage of total capacity.**
- **Red area on left side of scale warns user when fuel needs replenishing.**

ROCHESTER *Criterion* GAUGES

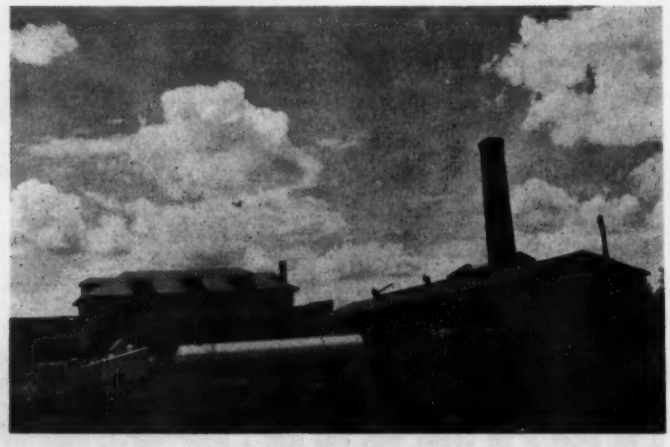
to fit his financial condition. If the prospect believes the new service will be more expensive than the fuel he now is using explain why LP gas can be used more economically than fuels the prospect is then using and that, with gas, large savings can be made.

Do not attempt to sell to the housewife so much steel and enamel, nuts and bolts, Mr. Kessler further counsels. Tell her what the new LP gas ranges, stoves and other equipment will do in terms of giving her better food, more easily prepared; more convenient, adequate and healthful home heating, and hot water for all family purposes at any hour.

Salesmen Selected with Care

These are some of the sales ideas Mr. Kessler impresses on the minds of his salesmen. He secures new salesmen through newspaper advertising, followed by impersonal interviews and then special instruction for about three nights. He finds that high-type men hesitate to attempt selling anything as technical as LP gas service and equipment unless they know something about it, and believe that the preliminary instruction period enables the company to determine whether or not the men are adapted to the business and their desire to sell this kind of merchandise. After that, they attend the regular sales school and continue to learn while earning.

Mr. Kessler, who has been sales manager for the American Butane Gas Co., for two years, and has a background of years of experience as manager of a factory branch for an automobile truck firm, and insurance salesman, believes that the fundamental principles of salesmanship are practically the same in all lines of business but that the LPG industry offers the best business opportunities today.



Main plant and first bulk station of Utilities Distributors, Inc., at Portland, Maine.

ENSIGN

BUTANE CARBURETION

A NEW SOURCE of PROFIT

BUTANE FOR TRUCKS, TRACTORS, BUSES, POWER UNITS

Haul the same load cheaper or a bigger load at the same cost and you're making money. To pull a big load does not require an engine that weighs a ton or one that costs a fortune. Keep your power plant weight down for additional pay load, speed and flexibility.

Actually there is a new kind of operating profit in Butane. Figure it out—lower fuel cost per gallon, greatly reduced oil consumption and reduced engine maintenance. Add these together, it is like money in the bank. Butane has long been an accepted fuel. Its merits have well been proven.

Successful Butane carburetion and its adaptation is the direct result of extensive engineering research. Ensign, with twenty-nine years carburetor building experience, maintains a half-million dollar laboratory and manufacturing plant with dealers throughout the United States to fulfill its obligation to the industry and its customers.

11,000 successful Ensign Butane installations are in service today. Let us supply you with information on Butane carburetion and installation.

ENSIGN

CARBURETOR CO., LTD.

HUNTINGTON PARK, CALIF. • DALLAS, TEXAS • CHICAGO, ILL.

FOR DEPENDABLE

SAFE OPERATION

USE REGO PRESSURE REGULATORS

The pressure regulator is the heart of any gas system. Don't gamble with safety, operation and real economy by saving pennies in first cost then spending dollars for service and replacement.

A feature of Rego construction permits the seat disc to be removed for cleaning or for replacement without disconnecting.

Rego regulators have large diaphragms which result in close regulation — it is not true economy to use units with small diaphragms.

Rego pressure regulators are designed specifically for the liquefied petroleum gas industry and, therefore, utilize special materials that resist the action of liquefied petroleum gases.

For dependable performance — specify Rego regulators!

The BASTIAN-BLESSING Co.

258 E. Ontario St. Chicago, Ill.

Butane Standby Augments Natural Gas System at Wilmington, Calif.

THE Southern Counties Gas Co., Los Angeles, operating a large natural gas distribution system in a number of southern California cities, was confronted with the problem of increasing the size of its main trunk lines, adding additional holder capacity or installing a standby plant at Wilmington in order to care for winter peaks and to provide service in case of temporary shut-downs of the main line.

The latter choice was made, and as a result one of the largest and most modern butane standby plants was constructed in the spring of 1939 and is available for operation.

Plant Capacity

The plant produces an air-gas mixture with a heating value of 1460 B.t.u. per cu. ft. This mixture was decided upon after extensive tests on appliances designed and adjusted for good operation on 1100 B.t.u. natural gas. It was found that satisfactory performance of this equipment was possible on a range of heat values from 1420 B.t.u. per cu. ft. to 1499 B.t.u. per cu. ft.

The plant has a send-out capacity of 188,500 cu. ft. per hour and for short periods is capable of producing 237,500 cu. ft. per hour. These send-out rates are equivalent, respectively, to 249,000 and 315,000 cu. ft. per hour of 1100 B.t.u. natural gas.

● **A. F. BRIDGE, vice president, and F. A. HOUGH, distribution engineer, Southern Counties Gas Co., Los Angeles, presented a paper before the Spring technical conference of the Pacific Coast Gas Association describing the Wilmington butane-standby plant, and this paper appeared in *GAS* magazine, May, 1939 (pp. 48, 49, 50, 54). The accompanying article has been abstracted to treat only the phases of special interest to those connected with the liquefied petroleum gas industry. —Editor.**

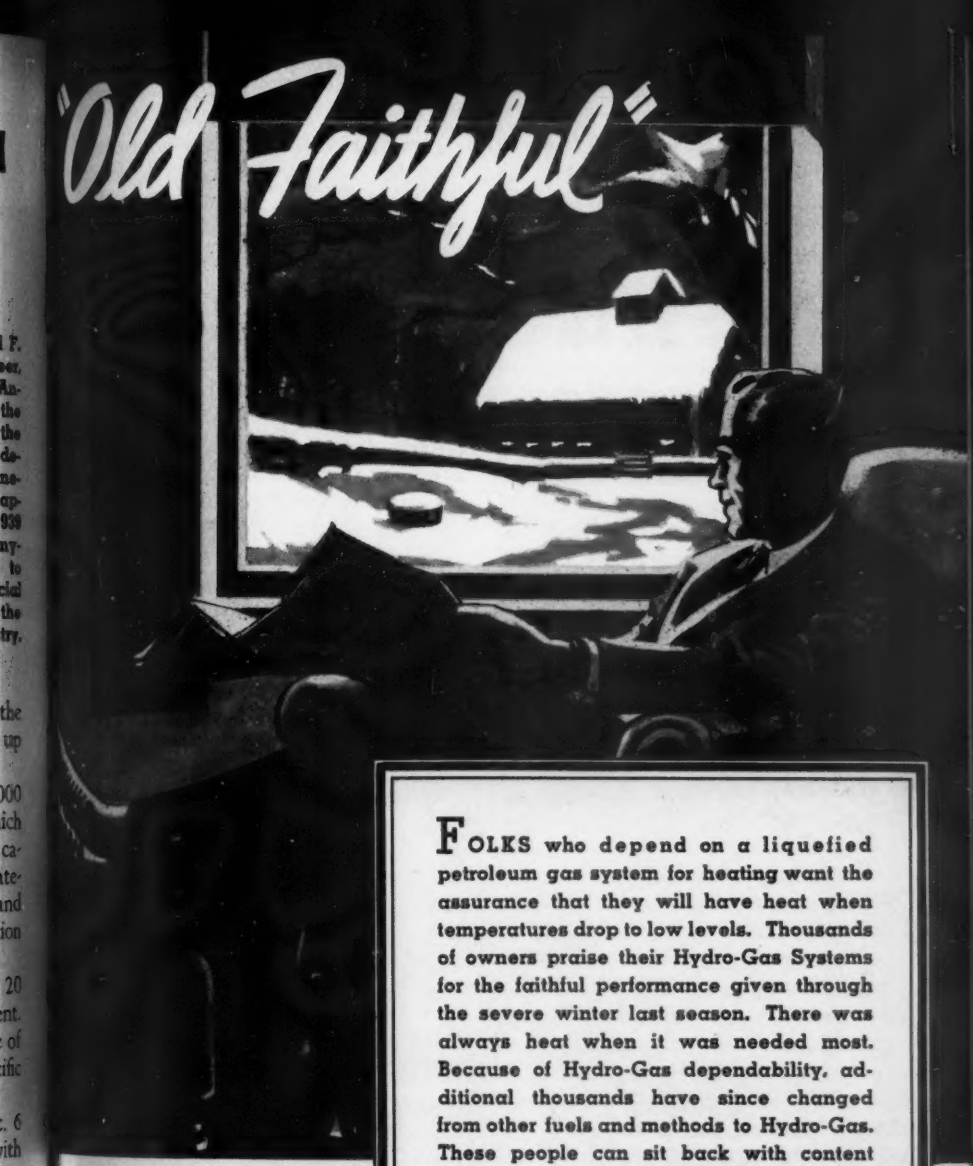
The gas can be delivered into the distribution system at any pressure up to 35 lbs. per sq. in.

Storage is provided for 375,000 gals. of liquefied petroleum gas which will operate the plant at its rated capacity for over 5½ days. The material stored is a mixture of butane and propane of the following composition (by volume of vapor):

Propane, 50 per cent; isobutane, 20 per cent; normal butane, 30 per cent.

This material has a heating value of 2975 B.t.u. per cu. ft. and a specific gravity of 1.83.

Ten horizontal tanks, each 10 ft. 6 in. in diameter by 68 ft. overall with hemispherical heads with a net capacity of 37,500 gals. and a water capacity of 41,840 gals. provide the storage. The tanks are designed for 125 lbs. per sq. in. working pressure in accordance with the API-ASME Code for unfired pressure vessels. All tanks



FOLKS who depend on a liquefied petroleum gas system for heating want the assurance that they will have heat when temperatures drop to low levels. Thousands of owners praise their Hydro-Gas Systems for the faithful performance given through the severe winter last season. There was always heat when it was needed most. Because of Hydro-Gas dependability, additional thousands have since changed from other fuels and methods to Hydro-Gas. These people can sit back with content and forget the forthcoming winter, knowing full well that the patented Vaporizer and Re-Vaporizer on their Hydro-Gas System will insure efficient service and faithful performance under every condition.

SOUTHERN STEEL CO.
SAN ANTONIO, TEXAS

HYDRO-GAS
The pioneer underground liquefied petroleum gas system. Correspondence is invited from responsible prospective dealers.

were shop built of welded construction and were stress relieved. (Fig. 1.)

Due to the large concentration of volume of L. P. G. extra precautions were taken in the design to provide for safe operation in case of an earthquake or fire. All valves used on the tankage are extra heavy steel, and all piping and fittings are steel and welded.

Each tank is protected with four 4-in. safety valves. In addition to the safety valves each tank has a separate vapor valve leading to a stack 100 ft. high into which the vapors from the tank could be discharged and burned in case of a major outside explosion. As the liquid lines from the tank are 3 in. in size and even in normal operation require a large flow, the use of excess flow valves was not considered feasible. In their place quick-closing valves held open by an electrically-operated solenoid are installed in each liquid line from the tanks. By opening the circuit with a switch in the control room, all valves close. A lead-sheathed insulated copper wire is run along all important piping and to parts of the plant where fires might be started, and is connected in series with the above circuit. In case of a break in a line or a fire, the lead sheath which is on a conductor will fail, opening the circuit and closing all valves.

Additional fire protection is provided by extinguishers and a water fog system to spray on the tanks to keep them cool in an emergency.

The liquid from the tanks is vapor-

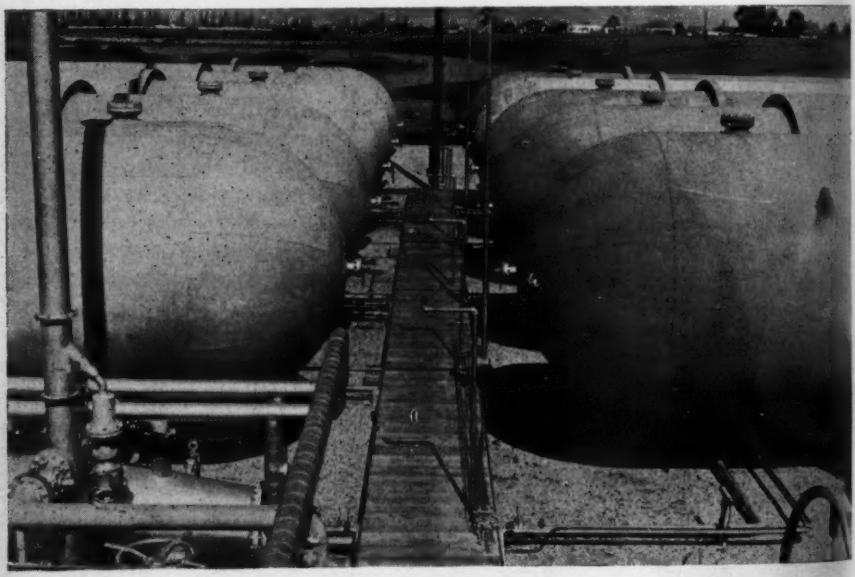
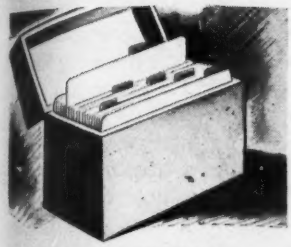
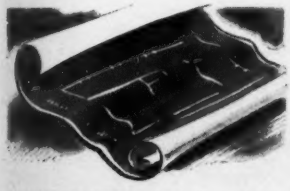


FIG. 1. Butane storage tanks, showing liquid level gages in the end of each tank and fog nozzles over the center of the walls.



DOMESTIC SUPPLY METHODS — Sales methods, marketing information, construction of plant facilities, are available to domestic suppliers who are customers of Shell.



INDUSTRIAL USES — Shell engineers are thoroughly experienced in all industrial heating application such as heat-treating and high temperature work. They are prepared to help you in design of new equipment, development of new processes.

COMMERCIAL USES—Shell engineers have helped develop processes for the use of liquefied petroleum gas in such widely varied services as gas enrichment, internal-combustion engine fuel, hotel kitchen and dining car fuel, etc.

NO MATTER WHAT THE PROBLEM...

Experience in every use is at your command when you specify Shell Liquefied Petroleum Gas

THROUGH years of experience, Shell has accumulated a wide variety of information on the uses of liquefied petroleum gas.

The breadth of this experience assures you of competent advice on such diversified subjects as equipment design, application methods, storage and handling methods, construction of facilities, and marketing information for domestic suppliers.

The length of this experience assures you of the soundness of the service offered you by the Shell engineering staff.

Shell's experience, Shell's technical service are as near to you as your phone. Simply call the nearest Shell office.

SHELL LIQUEFIED PETROLEUM GAS

Offices of SHELL OIL COMPANY, INCORPORATED • ST. LOUIS • SAN FRANCISCO • NEW YORK
INDIANAPOLIS • CHICAGO • MINNEAPOLIS • JACKSONVILLE • DETROIT • NEW ORLEANS • CLEVELAND

ized in a heat exchanger with hot water circulating through admiralty metal tubes and L. P. G. in the steel shell. Part of the tubes are above the liquid level to provide superheat to the vapors to prevent condensation in the lines before the pressure is reduced by the regulators. The hot water is supplied from the jacket water and exhaust of the gas engines that operate the air compressor. (Figs. 2 and 3.)

The air-gas mixture is controlled by a ratio flow controller, operating from orifices in the L. P. G. vapor line and the compressed air line. As the flow of L. P. G. vapor is increased the ratio controller operates a diaphragm valve in the air line to admit the proper amount of air for the mix. The mix is checked by a recording gravitometer which measures the gravity of the air-gas mix before it enters the mains

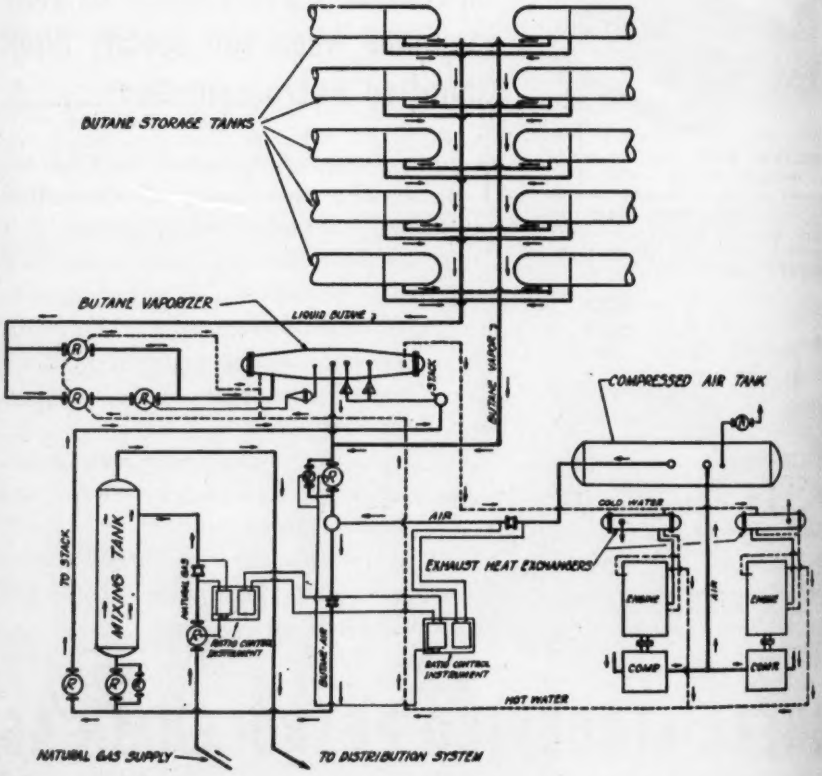


FIG. 2. Flow diagram of the Southern Counties Gas Co., a butane-air standby plant at Wilmington, California.

-Two-way satisfaction with Reliance Regulators:

The perfect efficiency of Reliance Regulators in liquid petroleum gas service makes satisfied customers at the buying end and saves time, work, worry and expense at the supplying end of your business.

Sensitive burners on appliances always get gas at the right pressure irrespective of the load or the generating capacity of the cylinders. Customers appreciate the Reliance Automatic Indicator that tells when to order more gas, thus saving emergency deliveries.

Uniform outlet pressures under all conditions insure satisfactory service, minimize maintenance costs and build customer good will.

Reliance Regulators are the highest development of control equipment for bottled gas service.

Send for special Bulletin

RELIANCE REGULATOR CORPORATION
1000 Meridian Avenue, Alhambra, Calif.

RELIANCE

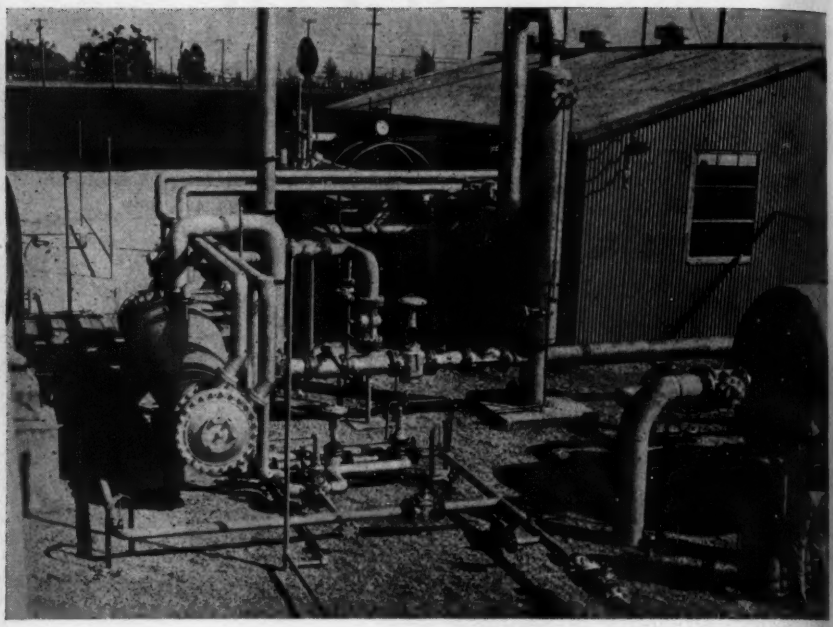


FIG. 3. Butane vaporizer and butane-air mixing equipment.

This gravitometer is equipped with an emergency range lining device which starts the gas from the plant by means of electrically operated valves if the air-gas mixture gets beyond the safe limit. (Fig. 3.)

Normally the plant is automatic in operation and all adjustments can be made from a central control room. The operating crew consists of three men, one in the control room, one to watch the engines and one outside in the plant to operate valves and check levels at the direction of the operator.

The plant has been tried out and operated as it would in emergency conditions with perfect satisfaction and stands ready to use at any time it may be called upon.

The engineering and construction were done by the Southern Counties Gas Co. under the supervision of A. F. Bridge, vice-president, and F. A. Hough, distribution engineer.

Fraser . . . one of the country's largest manufacturers, specializing exclusively in gas burning, warm air heating . . . offers a complete line of LPG burners.

Fraser LPG units range from Circulating Consoles to multiple outlet Winter Air Conditioning systems —a wide variety of types and sizes that fills every heating need. In each unit, Fraser engineering and Fraser quality assure operating economy . . . longer life . . . customer satisfaction.

Every Fraser LPG unit is individually teste with LPG fuel under actual operating condi tions before it leaves the plant . . . a sale and safety factor of the highest importance

Recently doubled manufacturing space assure prompt shipment of your order. WE SHALL AP PRECIATE YOUR REQUEST FOR ILLUSTRATE DATA AND SPECIFICATION SHEETS.

H. R. BASFORD CO.
DISTRIBUTORS
SAN FRANCISCO LOS ANGELES

FRASER

FRASER FURNACE CO
MANUFACTURERS
STAPLETON

BUTANE Power

AUTOMOTIVE DIRECTORY

● **Do you operate a butane filling station for automotive equipment? If so, list its name and address in the National Directory being compiled by this magazine. There is no charge.**
Send full information, including highway, address, and name of manager or owner, to BUTANE-PROPANE News, 1709 West 8th St., Los Angeles, Calif.—Editor.

Butane for Engines Discussed At S.A.E. Meeting in Seattle

"Fundamentals Pertaining to Internal Combustion Engine Fuels," was the subject of one of the principal papers delivered at the regional meeting of the Society of Automotive Engineers in Seattle, Wash., on Aug. 16-17. It was presented by S. H. Graf, professor of mechanical engineering at Oregon State College, Corvallis, Ore.

A discussion of Prof. Graf's paper was headed by Dr. Ulric B. Bray, consulting chemist, Los Angeles.

Among other points, Prof. Graf stated that at his laboratories in Corvallis there is now under development the calibration of an air-fuel ratio meter for use with butane. Instruments graduated for gasoline are inaccurate for use with butane, he stated, because the carbon-hydrogen ratio of butane is somewhat lower than that of gasoline.

In Dr. Bray's paper emphases were placed upon the two outstanding reasons for the current favorable showing of butane in comparison with other fuels, these being the use of higher compression ratios which are permissable with butane, and the better utilization of the available calorific values during the combustion stroke.

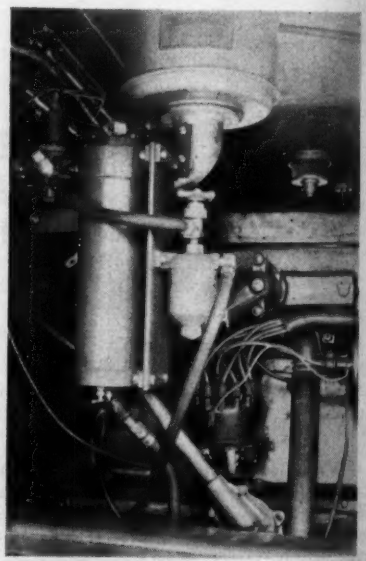
Other speakers at the session discussed problems of current interest to engine men.

◆ ◆

Algas Field Men Appoint Distributors in Midwest

In recent months American Liquid Gas Corp. has had two of its men in the Mid-Western field, opening up distributorships and acquainting the territory with the Algas line. These men are Fred La France and J. D. Arden, who have been concentrating their efforts lately in Oklahoma, Texas and Kansas.

According to Harold W. Smith, president of the corporation, sales of gas carburetors and converters indicate rapid advancement in the automotive field and substantial gains in equipment sales to trucks and for industrial equipment in Midwest.



A modern Ensign butane installation on a truck used at the Shasta Dam project, northern California.

New Automotive Course by U. of C. Extension Division

Designed for executives, semi-executives, and understudy men in the field of automotive transportation management is a new course which the University of California Extension Division will open in Los Angeles on Sept. 17.

"Automotive Transportation Management" is the title of the course to which a group of southern California executives will devote one evening a week for the next two years under the direction of Vernon D. Keeler, assistant professor of management and industry on the Los Angeles campus of the University of California. The course has been designed to deal with the practical problems involved in the effective organization and management of automotive transportation and will involve the use of motion pictures and actual experimentation, in addition to usual study methods.

◆ ◆

Transport Trailers and Storage Tank Go to Texas Firms

Two streamlined, twin butane transport trailers with a capacity of approximately 1500 gals. per tank have been manufactured for Earl C. Gibbon of Henderson, Texas, by Dallas Tank & Welding Co., Inc., Dallas, according to an announcement of W. W. Banks, president. Each trailer is equipped with 45 net gallon motor fuel tanks.

The Dallas company also announces the construction of a 4000-gal butane storage tank for Butane Gas Co., of Royse City, Texas, of which H. A. Otts is the owner.

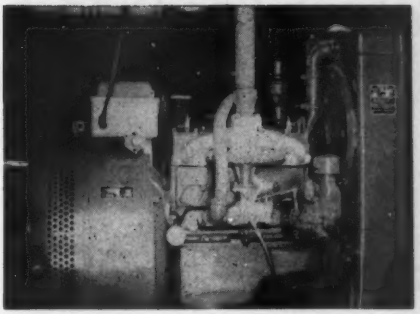
◆ ◆

Harman Pacific Co. Increases Distibution in the West

With the appointment of a new factory representative in Sacramento, Calif., on July 15, the Harman Pacific Co., Los Angeles, now has seven outlets in the West for the Harman rotary butane-propane pumps for storage plants and service stations. The Sacramento representative is the Burch Equipment Co., located at 1906 So. Alhambra Ave.

A direct factory branch of the company is maintained in San Francisco; there are distributors in Portland, Ore., and Spokane, Wash.; J. Howard Moore has the Fresno, Calif., territory, and Arizona is handled by McConkey-Docker Co., Phoenix.

All offices carry complete stocks of pumps and parts for immediate delivery.



A butane-powered Kohler electric plant, located at Tamarack Lodge, Twin Lakes, Calif., supplies light for the lodge and 32 cabins and refrigeration for meat counter in store. Butane is piped from an 830-gal. storage tank located nearby. Elevation is 8600 ft. The plant generates 5000 watts.

◆ ◆

Elmer Vanderbilt Joins Placer Gas Co.

Elmer Vanderbilt, formerly with the Auburn Lumber Co., Auburn, Calif., has recently accepted a position with the Placer Gas Co., of the same city, to direct butane sales for trucks, tractors and domestic use in Placer county.

The Placer Gas Co. is owned by William Schaller, of Auburn.

Heavy Duty Work

An article entitled "A Hefty Fuel for Heavy Hauling," by Kenneth R. Frost, will be found on page 41.

Look For Hidden Service Losses in Your Truck Expense Account

ONE of the difficult problems of every dealer and distributor of liquefied petroleum gas, appliances and equipment is the accurate estimate of delivery and service costs. One reason for this is the fact that the accounting department frequently fails to keep records of car and truck expense, including fuel and tire costs, interest on investment, depreciation, insurance, etc.

Careful driving will have a material effect on car expense, especially on brake and tire renewal costs. The tendency of many men to be less considerate of another's property than with their own should prompt business houses to encourage, even demand, conscientious driving. Employe cooperation saves up to 25% on costs.

The American Automobile Association, in 1939, compiled statistics which reflect a very factual record of operating costs for passenger vehicles, and the same plan may be applied very well to service operations, as the important items to be included are listed in the table below:

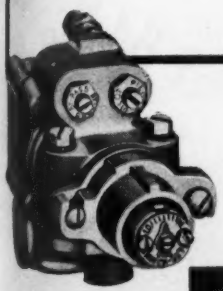
OPERATING COSTS FOR PASSENGER VEHICLES

	Light	*Medium*	*Heavy*	*Composite*
Basic Data				
List Weight (lb.)	2,600	3,200	3,900	2,800
Cost New.....$	$625.00	$1,400.00	$2,000.00	$840.00
Mileage Element Costs (Cents per mile)				
Gasoline, 20c per gal., including tax	1.25c	1.54c	1.67c	1.32c
Oil, 25c per quart, including tax	0.19	0.16	0.22	0.19
Tires and Tubes	0.21	0.31	0.40	0.23
Maintenance	0.53	0.60	0.65	0.56
Deprctn. (⅔ based on 7000 mi. yr.)	0.67	1.50	2.14	0.91
Total	2.85c	4.11c	5.08c	3.21c
Non-mileage Element Cost (Dollars yr.)				
Depreciation (1/3)	$ 23.41	$ 52.50	$ 75.00	$ 32.20
License	5.00	5.00	5.00	5.00
Garage Storage	36.00	36.00	36.00	36.00
Interest	18.72	42.00	60.00	25.00
Insurance	7.20	8.00	25.00	10.00
Total	$ 90.33	$143.50	$201.00	$108.70
Total Operating Costs (based on 7000 miles per year)				
Cents per mile	4.14c	6.16c	7.94c	4.76c
Dollars per year	$289.80	$431.20	$555.80	$333.20

ROBERTSHAW HEAT CONTROLS

Another big step forward in simplification—heat control dial and gas cock handle combined in a single unit and operated with a single motion! That saves time for the user. Also it ensures greater accuracy in baking and roasting: the control *must* be brought back to zero each time the gas is turned off, *must* be reset each time it is turned on. Now cooking by gas offers every advantage, including the highest development of automatic control.

"We favor adequate preparedness for national defense and recommend enlistment in the U. S. Army to eligible young men."



SIMPLE TO SERVICE

New simplified front calibration, by-pass and pilot adjustment. Can be checked with absolute accuracy at room temperature.

Oven valve and thermostat assembly form one unit removable from front without disturbing fittings. Cannot be replaced incorrectly.

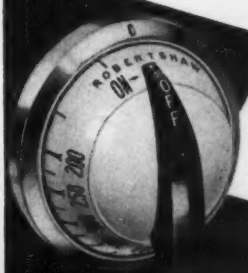
ARE YOUR SALESMEN ARMED WITH THIS EFFICIENT SALES MANUAL?

It's boosting earnings for thousands of salesmen every working day. Write for a copy — free.

SIMPLE TO OPERATE

A single motion

TURNS GAS ON FULL
SETS CONTROL



A single motion

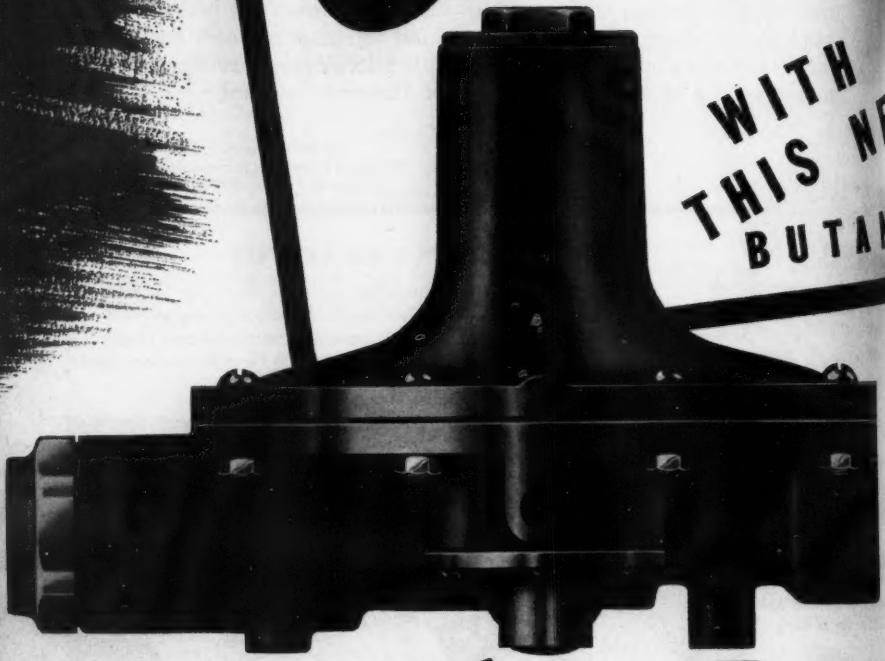
TURNS GAS OFF
RETURNS CONTROL TO ZERO

ROBERTSHAW SPEEDS SALES

ROBERTSHAW THERMOSTAT COMPANY, YOUNGWOOD, PA.

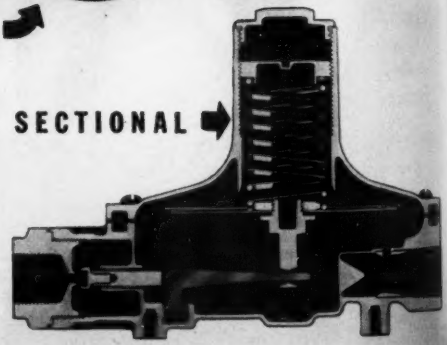
300 CUBI AT 5

WITH THIS NE BUTAN



TYPE 722 EXTERIOR

TYPE 722 SECTIONAL



FISHER GAS REGULATORS are individually built to meet your exact operating conditions

FISHER GOVERNO

FEET PER HOUR
LBS. PRESSURE
FISHER
LARGE CAPACITY PROPANE REGULATOR

NEW FISHER Regulator, Type 722, is especially designed for liquefied petroleum gas service where large demand loads must be carried even when tank pressure is the lowest. Type 722 will pass 300 cu. ft. or 45.9 lbs. of Butane and maintain suitable reduced pressures even though tank pressure is only 2 to 5 lbs. Unusually large capacity is made possible by the unique assembly design (patents pending) of the diaphragm, valve disc and lever.

Here is a regulator which will overcome your cold weather problems because you can now handle large loads even when your tank pressure drops to 2 pounds. Ordinary regulators have extremely limited capacities at this pressure.

The heart of your Butane system is the regulator. Specify this new Fisher exclusive development and avoid low pressure trouble next winter.

Type 722 is listed as standard with the Underwriters' Laboratories.

Other Construction Features

★***Gas tightness—Greater strength*** —Body and cover are of alloy metal, having higher tensile strength and closer grain structure than iron.

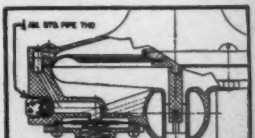
★***Inlet adaptor***—Made of high quality brass bar stock.

★***Composition valve disc*** — Easily accessible and renewed by removing the inlet adaptor.

★***Diaphragm*** — Highly resistant to Butane Propane gases.

BUILT-IN RELIEF VALVE

An integral part of the regulator body. Factory set and sealed for 1 pound. The main diaphragm breather connection is vented through relief valve opening.



WRITE TODAY for FREE Catalog 42-D—and latest prices on these and other FISHER Regulators for the liquefied petroleum gas industry.

COMPANY 916 FISHER BUILDING MARSHALLTOWN, IOWA

An Underground "Defense"

By M. E. McKAY

Southern Steel Company, San Antonio, Texas

FUEL service supplied by underground liquefied petroleum gas systems wherever the service has been extended is an aid to the sick and the aged, a savior of life and property, a provider of priceless comforts, an agency which promotes social intercourse, and even prevents extermination of livestock in extreme cold weather—all of this from records which can be produced.

'Grounders Admire the Bottlers

We folks of the underground type of operation have closely observed the bottled gas people. We like and respect them. We early saw they were for the type of thing that has made the liquefied petroleum gas industry safe and acceptable and essential in the estimation of people everywhere. They made the industry a great industry.

Underground System Marketers, as their numbers increased, were welcomed into the trade association by the Bottlers. I doubt if it can be a case of being embraced by love. The Bottlers quickly moved to protect their own standing in the public esteem by reaching out to include their young brother, making available to him the benefit of their greater wisdom and longer experience thus avoiding penalizing reflections upon the industry as a whole from grievous errors which the 'Grounder was certain to make if he went his way unadmonished and uninformed.

Underground System Marketers — butane gas system dealers—are most frequently described in places of prominence and their operations held up to the light by miscellaneous individuals here and there who are engaged in other types of operation within the industry. As a result, my remarks may border on a defense of the 'Grounders. A very considerable number of BUTANE-PROPANE *News* readers are engaged in the underground type of operation. Possibly it follows that extension of these remarks in the columns of BUTANE-PROPANE *News* is justified.

Fewer Installments

The sale of a sufficient number of gas appliances to meet the desires for modernity in the average outlying home, and the installation of equipment of sufficient capacity to meet the fuel requirements without too frequent re-filling or moving in and out of containers does not result from the efforts of one inclined to take it easy or use unstudied, slipshod methods in his contact with the potential customer.

For those who may be so inclined, there is small cause for experienced gas people to decry the entry into the

Increase your PROFIT by installing ECONOMY Dual Oven Ranges

Above-- New streamlined dual-oven ECONOMY combination range, ideal for home installation, approved by the American Gas Association Testing Laboratory for every kind of gas. Send for catalog showing specifications, also complete line of ECONOMY Ranges.

Before You Order Another Range

be sure to get the new ECONOMY Catalog. It's FREE, of course. For convenience, mark and tear out coupon at right, paste on postcard or drop in envelope, and mail.

SEND FOR 1940 CATALOG

Performance builds Profit! Performance is the cornerstone of every successful L. P. G. business. And ECONOMY Dual Oven Combination Ranges insure the dependable performance of your installations.

ECONOMY makes a complete line of Household and Commercial Ranges. Engineered particularly for propane and butane gas. Designed right, priced right, made right—ever since 1849.

Gets 7 Out of 10

L. D. Beckett, distributor at Cameron, Mo., reports: "We landed 7 out of every 10 commercial jobs in our area this past year. ECONOMY Ranges are largely responsible. Each ECONOMY installation paves the way for more sales."

Make today's installations help build tomorrow's sales. Get the facts about ECONOMY Ranges. Send coupon for 1940 catalogs.

Comstock-Castle Stove Co.
Quincy, Illinois

Send your 1940 catalog on

- ☐ Household Ranges
- ☐ Commercial Ranges

Name_____

Address_____

_____

LPG system industry of men whose experience has been gained in other lines. This is a new industry. Henry Ford did not remain the single dominating factor in the motor vehicle industry, just as Harvey Firestone eventually found that others were qualified to expand the gigantic tire industry. Mr. Drake, who perpetrated Drake's Folly at Titusville, Pa., soon found that there were others qualified to drill oil wells and handle the products. When alarm or concern is evidenced by gas people because of inexperienced people entering a new industry, and it is coupled with an expressed belief that those newcomers enjoying a growth will eventually be stopped by a lack of capital, a particularly unreliable reflection is made. New and inexperienced entrants into a rapidly expanding industry, even though temporarily under-financed, can and will succeed. Vision, energy, and capability, with temporary inexperience detracting, have played a far more prominent part in industrial development in this country than money and experience. It was not individual or corporation fortunes which brought about the establishment at the outset of the telegraph, the railroads, or the gigantic public utilities. Search the old rec-

Preparing to install a Hydro-Gas underground system on a Texas farm.

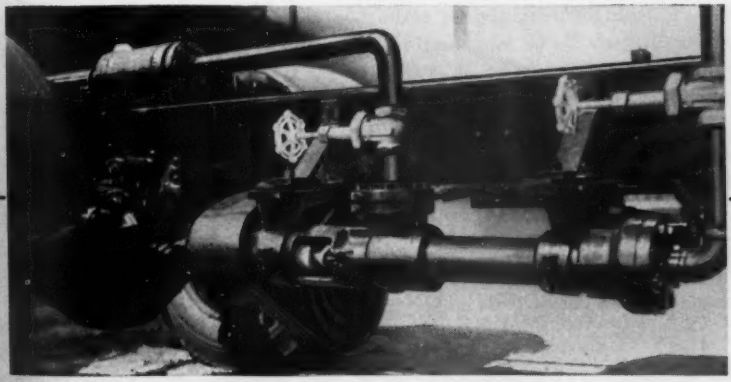
MOYNO L.P.G. PUMPS

Tailored to Tank Truck Trade

The Moyno 2-Stage L.P.G. Pump was designed to insure tank truck operators safe, economical, trouble-free distribution of butane and propane.

It is capable of handling differential pressures up to 150 P.S.I. Its physical construction permits lengthwise mounting along truck's chassis and simple V-belt connection with power take-off, as in the photo below.

Get complete details on this revolutionary pump before equipping *your* trucks. Mail coupon TODAY.



ROBBINS & MYERS, Inc.

MOYNO PUMP DIVISION

SPRINGFIELD, OHIO

ROBBINS & MYERS, Inc.
Moyno Pump Division, Dept. C
Springfield, Ohio

Please send descriptive bulletin on
☐ Moyno 2-Stage tank truck pump
☐ Moyno single-stage bulk station pump

*Name*_____

*Address*_____

*City*_____ *State*_____

FROM THE L.P.G. DEALER'S POINT OF VIEW, THREE BIG ADVANTAGES MARK *PAYNE* L.P.G. FURNACES.

1. *Individual Testing:* Every single Butane-Propane-fired *PAYNE* unit is individually tested at the factory in the *PAYNE* Laboratory.

2. *Custom-Adjusted:* Each *PAYNE* L.P.G. Furnace adjusted by actual test according to B.t.u. heating value and specific gravity of the mixture it is to burn.

3. *Time-Proven:* Hundreds of installations in over twelve years attest *PAYNE'S* knowledge of Liquefied Petroleum Gas fuel. We leave nothing to "guesswork".

PAYNE'S line-up of L.P.G. equipment includes MODERN CONSOLES, FLOOR FURNACES, DUPLEX FURNACES, ZONEAIR UNITS, FORCED AIR UNITS and GRAVITY FURNACES ☆ A few PAYNEHEAT dealerships are open in L.P.G. territories. Write Mr. J. H. Keber, Sales Manager, Payne Furnace & Supply Co., Inc., Beverly Hills, California.

PAYNEHEAT

Payne **FURNACE & SUPPLY CO., INC.**

ords of accomplishment and you will find stories of the individualist with a determination to succeed, one who was fascinated by his work as was Samuel Morse, James J. Hill, and Thomas Edison.

I feel all buoyed up over the progress of our industry, as a whole; proud of its safety record, and content with the belief that informed elements in the industry will guide the less informed in the channels of safety and finance, until along comes someone who by direct statements or innuendos reflects that a great portion of the people in the industry must be wrong.

Complete Service for Ruralist

Those who reflect that success cannot be attained in the underground type of operation and who indicate that a less permanent type of installation can more properly be made because of the probability of the city gas mains being eventually extended to meet fuel requirements in a given area, are lacking in vision and certainly lacking in ambition. It is well established now that it is no longer necessary to make expensive extensions of city gas mains, since complete fuel requirements of an isolated home can be safely and adequately met by the installation of an LPG system. There isn't much of a future in store for the person or small company supplying only a temporary service, thereby making future business for a big city gas company. There is a fine future in the industry for the individualist who will work to the end that he may serve a community or a number of communities with

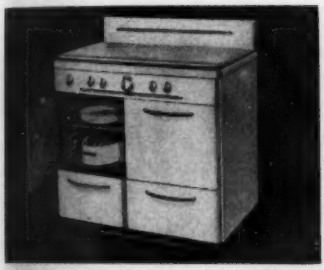
A LEADER — A LINE — AND A PLAN
That Sells LPG Ranges Faster!

IN 3 FAMOUS TRADE NAMES

Acorn
Since 1830

ORIOLE
Since 1911

VULCAN
Since 1889



Non-competitive models with Super-Center tops, heated warming ovens, and thrift cookers in exclusive combinations.

Price leaders, deluxe models in volume price brackets; models from 40 down to 20 with 27 important improvements.

Here's a complete merchandising set-up that will help LPG dealers sell more range installations. It consists of a leader with an exclusive combination of specialty features—a wide line that captures public interest everywhere—a promotion plan packed full of money-making ideas.

The plan includes business-building displays, floor demonstration ideas, newspaper ads and direct-mail helps built around a dramatic "8 Keys to Kitchen Freedom" appeal—and a complete sales manual with a sales clincher in the form of actual figures which show how modern LPG ranges help pay their way by savings on food.

Write today for the complete story

Standard Gas Equipment Corporation

18 East 41st Street, New York

Boston · Philadelphia · Baltimore · Chicago
Aurora, Ill · New Orleans · Los Angeles

a liquefied gas service. There is no reason for him to fear encroachment or impositions on the part of the city gas company. Experiences indicate that he can expect friendly cooperation from existing natural and city gas companies where he does not choose to antagonize interests of those companies.

There are a number of gas utilities now supplementing their consumers with liquefied petroleum gas service.

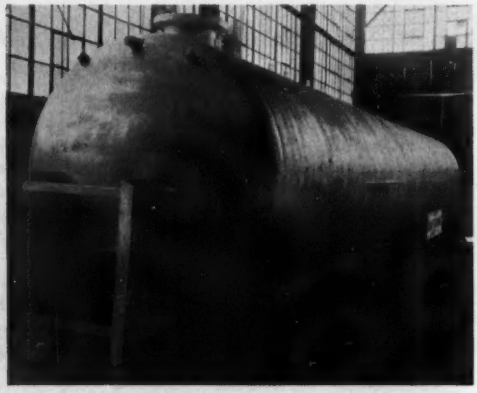
Scores of users of liquefied gas have indicated their preference for it over natural or manufactured gas or electricity. By the one best qualified to judge its merits—the user—liquefied gas service is not by any means regarded as a temporary service to be tolerated until a better comes along.

There are people who believe that certain definite areas can be better served by an alternate type of operation. Such a conclusion may have been arrived at by those who have been defeated in attempts to operate in the underground division due to a lack of the requisites for the sales and servicing of underground systems.

Inability to Sell?

Those defeated ones, turning to a more restricted type of operation, may well have done so because of their inability to "sell," but found themselves qualified to "take orders."

We are indebted to W. B. Oliver, speaking before a recent meeting, for these remarks, in substance, which I



18,000 Gallon Water — 15,000 Gallon Liquid Propane Capacity Storage Tank 8' 2¼" diameter and 50' 5¼" long; 200 lbs. per square inch working pressure.

LEADERSHIP!

Quality - Safety Economy

Butane-Propane tanks fabricated in strict accordance with the ASME code; API-ASME Code; Dept. of Public Safety, Commonwealth of Massachusetts; and National Board of Boiler & Pressure Vessel Inspectors regulations.

Bulk Tanks - Skid Tanks Truck Tanks for

Butane • Propane Butane-Propane Mixtures

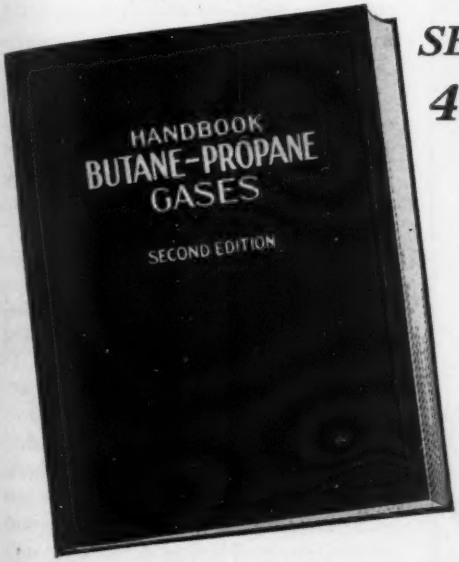
Complete bulk plants designed, fabricated and installed by experienced men. Detailed information and estimates furnished without obligation.

LANCASTER IRON WORKS, INC.

LANCASTER PENNA.

Handbook
BUTANE-PROPANE
GASES

Latest Revision
November 1938



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CONTENTS: Semi-Bulk Distribution: Use of Butane in Buses: Combination Propane Operated Utility Plant: Use in Internal Combustion Engines: Design & Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economical Comparisons with Coal, Oil, Electricity, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Special Uses: Volume Correction Factors: Transportation: Use with Other Gases: Analysis & Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

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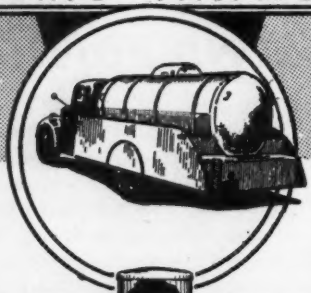
LOOK TO THE
Leader
FOR BETTER TANK
Values

BUTANE-PROPANE....
★ UNDERGROUND TANKS
★ BULK STORAGE TANKS
★ TRUCK TANKS
★ SKID TANKS



Our tanks are designed and supervised by men with over 20 years' experience in the construction of containers for high grade pressure fuels.

A. S. M. E. CODE CONSTRUCTION
ECONOMY BUTANE-PROPANE SYSTEMS are constructed for 100.8 lb., 125 lb., and 175 lb. working pressure for underground use; 200 lb. working pressure for above ground. Approved by Underwriters' Laboratories; Inspected by Ocean Accident & Guarantee Corp., Ltd. Write, Phone or Wire for Details!
"Tanks By Banks"

DALLAS TANK
AND
WELDING CO., INC.
201-5 West Commerce Street
DALLAS, TEXAS

think apply. " . . . the public will become receptive to whatever is necessary to make for them a modern, safe usage of a modern product," and " . . . this can be accomplished by a constant, constructive sales effort, just the opposite of order taking on price alone."

It is reasonable to conclude that the rapid and broad expansion of the underground type of service is in a large measure traceable to the fact that other types of service have failed to meet the demand for fuel, mainly due to the character of alternate types of operation and because the methods and equipment employed restrict possibilities of meeting complete fuel requirements of those beyond the gas mains.

Long Term Financing

Reasonably, can the wide-spread practice of financing of underground gas system installations by FHA financing, or C. I. T. financing, or another type of financing be pointed to as an indication that the underground type of operations are to be short-lived? No. Such financing arose out of a necessity. Here is a case typical of thousands: Having no safe or sure means of heat, no reliable method for cooking, no economical method of heating water, home comforts and conveniences seem destined to be denied. The underground system marketer comes along and offers his service. The cost of installation is at first appalling. But satisfied users, friends, advise, "By all means get the liquefied petroleum gas service." By means of long term financing, a gas fuel service is installed which contributes to

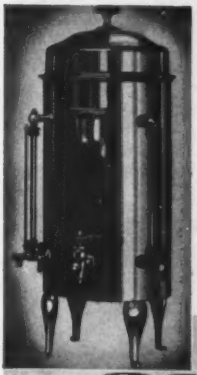
health and happiness. Suppose it does take 15 years to pay for it? Suppose the underground equipment must be replaced before the passing of fifteen years' time—such will not be the case—but suppose that it is? The underground equipment actually represents a small portion of the complete cost, which always includes several appliances and many feet of pipe and expense of installing. I know the service to be such that users of underground systems will not be overwhelmed by the fact that they will have to replace underground equipment, any more than they would be overwhelmed by replacement of a wornout or unsafe automobile tire. There is a way to perpetuate a household necessity—and the safety angle can be well cared for. Certainly an operation as broad as the underground gas system business can be as alert to the element of safety as any other operation.

Safety Requirements Will Be Met

Arising from old-fashionedness, or effeminacy, or too constant home contact, there are those whose tendencies are to overdo, verbally, espousal of the cause of the occupants of the home. Seldom is a tirade aimed at an operation such as one that I instantly call to mind, the erection of a gigantic dam. Seven million cubic yards of earth are to be moved, requiring 24 months' time. Thirty motor trucks and many tractors are employed. Liquefied petroleum gas is the fuel employed. Thousands of gallons are permanently stored nearby. Men who maintain homes and who are responsible for the existence and

BOOST LPG SALES WITH *Blickman* HEAVY-DUTY FOOD SERVICE EQUIPMENT

. . . designed especially for use with Butane-Propane



• Dealers everywhere are enthusiastic at the interest restaurants and commercial cooking establishments are showing in this line of superlatively-built equipment. Send the coupon below for further information.

Left: Coffee Urn
Below: Steam Table

S. BLICKMAN, INC.
Manufacturers of Food Service Equipment
534 GREGORY AVE. WEEHAWKEN, N. J.

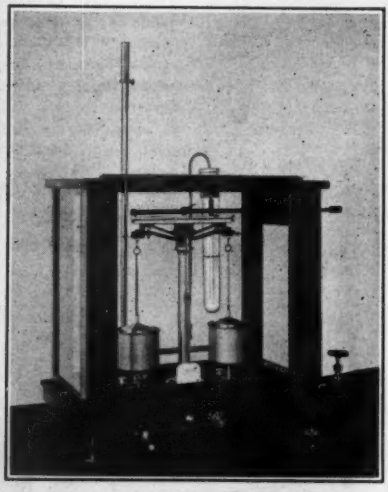
Gentlemen: Please send catalogs showing complete line of Food Service Equipment including Coffee Urns, Steam Tables, Luncheonettes, etc.

Name_____

Address_____

City_____ State_____

SEE WHAT THIS NEW LABORATORY BALANCE *Can do for You!*



Reads Specific Gravity of Gases Direct to Third Decimal Place

Tests gases that are lighter or heavier than air. Operation is similar to ordinary analytical balance, except that perfect damping permits bringing needle point to rest exactly at zero, instead of noting its oscillations across scale. Normal range calibrated between .50 and 1.50—other ranges can be furnished. Requires only a very small sample. Send for Bulletin No. 111.

AMERICAN
RECORDING CHART CO.
3113 E. 11th St., Los Angeles, Calif.

health and happiness of the home and family, are in close contact with such operations. Liquefied gas trucks move up and down the highway in close contact with thousands of the populace. Seldom does one hear reflections upon the methods of those responsible for such operations. Such operations are made safe, not because responsible individuals or corporate authorities especially enjoy spending the money to make them safe. Requirements for safety are simply met. Requirements for safety can be and are met in the underground type of operation.

Used by the Best

City gas companies, the naval training service, the coast guard service, war department engineering divisions, army post commissaries, school boards, small industries, private engineers, and many intelligent individuals, all well advised and well informed concerning the requirements for safety and reliability in design, construction and installation of equipment for storing and dispensing of LP gases, are regularly specifying and regularly purchasing and having installed the underground type of system, rather than the aboveground tanks. These are strong endorsements.

We are striving to improve equipment and service and are not content to drift. But at this time, and as a final convincing estimate of the safety, reliability, and economies of our procedure, we rest our case completely with the thousands served by underground liquefied petroleum gas systems.

We believe we have earned the right to honest pride in achievement.

LP Gases Play Chemical Role

THE call of the internal combustion engine for more and better fuel and lubricant has fallen heavily upon many branches of technology during the past 25 years.* The major contributions of chemistry have been to the treatment of the crude oil at the refinery, and so significant are these that the petroleum industry now emerges as one of the chemical process industries.

Indications increase that this industry is destined to play still more important roles in the development of the chemical industry of this country. Even now chemical alteration is involved in the production of most of our gasoline, and as Dr. Robert E. Wilson, President of Pan American Petroleum & Transport Co., stated in his recent Society of Chemical Industry Medal address, we have only begun to utilize the most chemically useful raw material that this industry affords—the various constituents of refinery gas.

By-Product of Crude Oil

Between 7% and 8% by weight of the total crude oil processed in our refineries is converted into gas as a by-product. Such a statement, however, does not afford an adequate picture of the quantity available, which amounts to about 940,000,000 cu. ft. per day, or 14,000,000 tons per year.

*The accompanying article is quoted from the Industrial Bulletin of Arthur D. Little, Inc., for January, 1940.

Let's Talk Prices!

We might as well
Your customers do

Royal Rose Gas Ranges are built on a volume basis. This gives you construction details found only in higher priced ranges, at a scale of prices which will enable you to sell at a low price and still make a profit. You will also make a friend with every sale as the performance is so efficient that the consumer will be a happy user.

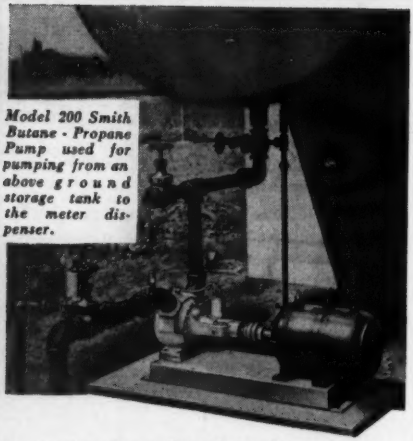
Our fifty-five years of selling ranges to the Metropolitan New York Area where most of them are subject to hard usage of tenants, has taught us to build ranges that will stand up in any market, and give exceptionally long life when used by the owners themselves.

We have a special proposition to offer you, so write soon for literature and prices.

J. Rose & Co., Inc.

"Established 1885"

25 WEST 29 ST. NEW YORK



Model 200 Smith Butane - Propane Pump used for pumping from an above ground storage tank to the meter dispenser.

1. **No Packing Gland Leaks**
2. **Ample Pressure Differential and Capacity**
3. **Elimination of Excessive Wear and Early Loss of Efficiency**

These are *exclusive features* of Smith Butane-Propane Pumps that are *vitally essential* to satisfactory LPG pumping service. Users and dispensers of liquefied petroleum gases cannot ignore them without an inevitable day of *costly* reckoning

You can avoid pumping troubles, inefficient pumping, excessive wear, costly repairs and replacements by specifying Smith Butane-Propane Pumps. Their superior performance has been definitely established. Compare actual performance in service.

Designed for all LPG pumping services including bulk and dispensing plants, bottle filling, tank trucks, refineries, pipe lines, etc. Detailed information supplied on request.

SMITH PRECISION PRODUCTS CO.
1135 Mission Street, South Pasadena, Calif.

SMITH
BUTANE - PROPANE
PUMPS

The problem which this situation poses is that of converting a by-product into a co-product. Such developments fall naturally into three categories according to Dr. Wilson:

(1) Refinery gases as raw materials for the chemical industry.

(2 Direct utilization of compounds separated out of refinery gas.

(3) Conversion of refinery gases into motor fuel and other products primarily useful within the petroleum industry's many branches.

Synthetic Chemicals

A fascinating chapter in the American chemical industry has already been written concerning the first of these. Ethylene, propylene and the butylenes have so far been the most useful constituents of refinery gas for chemical processing. One company is making commercially more than 100 synthetic chemicals from them. The three most important primary products synthesized from cracked gas are ethylene glycol, isopropyl alcohol, and ethyl alcohol, for the latter of which the installed capacity is equal to about half of the total industrial alcohol production of the country. This broad invasion of the fermentation field by petroleum products conjures up an interesting extension of certain well-known gasoline brand names in America today!

Most of the acetone on the market today is made from isopropyl alcohol, and at a price which has greatly stimulated the manufacture of cellulose acetate (rayon and plastics) through making available very cheap acetic anhydride. Several of the newer

plastics are or can be made from constituents of refinery gases, and it is predictable that the growth in manufacture of elastomers will be based largely upon petroleum gases.

While the above-mentioned accomplishments and prospects are of the greatest importance to the manufacturing chemical industry, they are not so important to the economics of the petroleum industry because the total volume of refinery gases is hundreds of times as large as the chemical industry is likely to use in the near future. Direct utilization and conversion into motor fuel are of far greater immediate importance.

New Discoveries Bring Changes

The most readily liquefied constituents are now 75% recovered and put into gasoline to improve or control volatility. A revolutionary development in the manufacture of lubricating oils has followed the discovery of the unique properties of propane, a major constituent of refining gases, as a refining agent. Even more important from a volume standpoint are the growing uses of liquid propane as "bottled gas" for cooking and heating where city gas is unavailable, and in other miscellaneous fuel uses. The total consumption in these uses is around 150,000,000 gals. yearly.

The latest and in many ways the most intriguing and important research achievements of the industry are several new processes which make it possible to convert a large part of these refinery gases into gasoline of unusually high quality (around 85 octane). These new processes, categorically called polymerization processes, are

ARMSTRONG HEATERS

The 4-Star Line

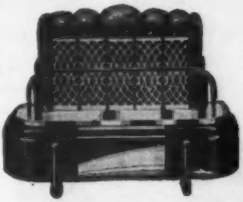
★ QUALITY
★ EYE APPEAL
★ LOW PRICE
★ REDUCED SERVICE CALLS

Four reasons why dealers are finding Armstrong Heaters such big sellers and such good profit makers.

900 Radiant Circulator

A real beauty in design and finish. An exclusive Armstrong feature is a clay heating element that produces both radiant and circulating heat. No gas odors. Finished in rich brown porcelain enamel and non-tarnishable chrome. 3 sizes, 14,000, 18,000 and 28,000 B.T.U. A.G.A. approval.

790 Radiant Heater



A popular seller. Body finished in brown vitreous enamel with heavy chrome hearth, front panel, dress guards and tubular legs. Glazed backwall is light tan shaded with brown. Light faced radiants harmonize with body. 2 sizes 20,000 and 24,000 B. T. U. A. G. A. approval.

11 DIFFERENT STYLES

In the complete Armstrong line, there are 11 styles especially designed for liquefied petroleum gases—every one a big value—sized from 12,000 to 30,000 B. T. U. Finishes harmonize with any home or office surroundings.

PLAN NOW

for this profitable fall and winter business. Send for illustrated literature and attractive dealer discounts. Address Dept. BP.

ARMSTRONG PRODUCTS CORP.

Quality Appliances Since 1899
HUNTINGTON, W. VA.

SMITH *Butane* METERS
SAVE YOU MONEY BY
EFFICIENT, ECONOMICAL
MEASUREMENT

MASTER BU-40
—where corrosion is a problem.
STANDARD BU 40
—for non-corrosive liquefied gases.

The new BU-40 Smith Butane Meters represent the latest advance in modern metering equipment for Butane or Propane tank trucks and dispensing racks. They combine all of these modern metering advantages: 250 lbs. working pressure—built-in strainers—fast flow—extremely low head loss—rotary positive displacement—precision construction plus guaranteed sustained accuracy. Available with horizontal or vertical dials, with set stop counter or ticket printer.

SMITH METER COMPANY
5743 East Leneve Street
Los Angeles California

SMITH METERS

WRITE FOR THIS BULLETIN
Bulletin 123 gives full details about Smith Butane Meters. Write for your copy today.

now producing 600,000 gals. of gasoline daily in this country, and capacity is being expanded.

Other processes are making these refinery gases a most important source of the super anti-knock fuels (95-100 octane) for aviation use. While the value of these super-fuels is being stressed in connection with military aviation, they are also of immediate interest to commercial aviation, which can well afford to pay a premium for greater engine efficiency and power output. To quote Dr. Wilson, "High octane gasoline in aviation means a smaller load of fuel, a lower engine weight per unit power output, and lower head resistance both because the engines are smaller and because the conversion of more of the fuel into power reduces the amount of waste heat that must be dissipated through the cooling system." Present installed capacity of around 400,000 gals. per day of these super-fuels is being increased rapidly.

◆ ◆

Leo Norton Buys 14-Year-Old Gas Business in Hemet, Calif.

Leo Norton has purchased the gas business of J. H. Remington, at Hemet, Calif., where for 14 years Rock Gas has been sold to the surrounding territory and to the pleasure resorts in the adjacent San Jacinto mountain area. With the business, Mr. Norton bought the home and appliance stock of Mr. Remington. Rock Gas is the product of the Imperial Gas Co., of Los Angeles.

Mr. Norton has been in the employ of the Richfield Oil Co. in the San Joaquin district for many years, but maintained a mountain cabin near Hemet for his vacation periods. There he used Rock Gas, and it was from this contact with the fuel and with Mr. Remington that he finally acquired the latter's business.

American Standards Association Accepts More A.G.A. Standards

Three sets of requirements sponsored by the American Gas Association were accepted as American Standard by the American Standards Association on July 15. These include recommended revisions to the current American Standard Approval Requirements for hotel and restaurant ranges, Z21.3-1938; for central heating gas appliances, Z21.13-1940, which become effective on January 1, 1941; and a new set of requirements for deep fat fryers, Z21.27-1940. This action supplements the 10 sets of standards adopted in 1940 as American Standard on Feb. 23, 1940, to become effective on January 1, 1941. These additional standards likewise become effective at that date.

Advantage was taken in revision of the current requirements for hotel and restaurant ranges to extend its scope to cover unit broilers.

To permit Laboratories' approval of wall-register type floor furnaces, a type recently developed to meet consumers' needs in the West and Southwest, it was felt advisable to incorporate in the American Standard Approval Requirements for central heating gas appliances such provisions as would adequately cover their safe performance under the installation conditions for which such types of units are intended. Therefore, the section on wall, floor, and flue temperatures was revised to permit testing of wall-register type. No contacts with combustible materials may exceed 90°F. above room temperature.

Other revisions deemed necessary for inclusion in the central heating requirements are constructional provisions for preventing condensate from entering pilot lines and their exposure to damage hazards.

Although these requirements become effective January 1, 1941, manufacturers desiring to do so may submit their equipment for test for compliance therewith in advance of this date. For additional information, inquiries should be addressed to the American Gas Association Testing Laboratories, 1032 East 62nd Street, Cleveland, Ohio.

Printed copies of these standards are available at nominal cost.

"Bigger Profits!"

Report L. P. G. Dealers Selling the

Anderson

GIVE MORE! EARN MORE! with the WORLD'S FINEST COOKING MACHINE!

Not just "another' range—but a marvel of cooking convenience, economy and efficiency. Cooks on sealed-heat with the GAS TURNED OFF! Saves housewives hundreds of hours yearly—improves flavor of every food—preserves vitamin goodness! Handsome . . . packed with practical, appealing features. Gives you a dramatically different sales story —plus greater profit-per-sale. All models approved by A.G.A. for LP Gases.

GET THE FACTS!

ANDERSON STOVE CO., INC.
Anderson, Ind.
Show us the way to those "BIGGER PROFITS" **(4)**

Name.....

Address.....

City..... State.....

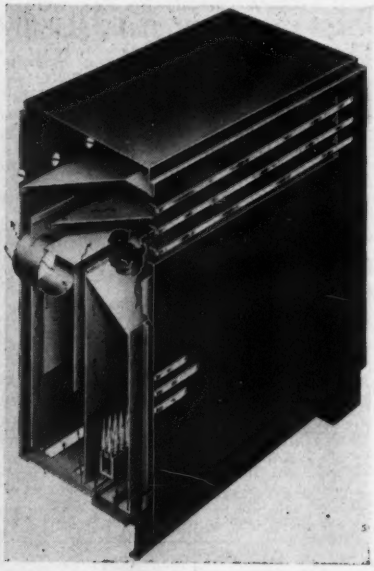
PRODUCTS

Console Heater

Payne Furnace & Supply Co., Inc., 336 N. Foothill Rd., Beverly Hills, Calif.

Model: Series 3.

Description: This Payne modern console heater is designed for the small home or wherever unitized heat is advisable, such as motor hotels and cottages, shops and stores. It circulates, rather than radiates, its heat. It has a durable, all-welded, heavy gage heating element, with scientifically designed, precision-machined burner; inner baffles assure longer fire travel and more uniform distribution of heat; built-in draft diverter helps to protect against burner flame becoming extinguished; underneath shield prevents overheating of floor; insulated air passages keep down temperature of cabinet, affording protection against burns and preserving finish on cabinet. Has constant-burning pilot. Regularly furnished in ivory, Montery biege, and grained walnut. Other colors on special order. Comes in six sizes, ranging from 16x12x30¾ in. to 40x18x38 in.; shipping weights from 74 to 266 lbs.



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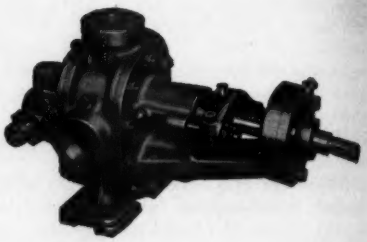


Butane Pump

George D. Roper Corp., Rockford, Ill.

Model: 3600 HBD.

Description: This model was designed for use on trucks carrying butane or propane and was built to endure severe operating conditions. The entire load is distributed on the four, large, high lead bronze bearings; self-lubricating qualities of bearing metal are ample at maximum speed and pressure; extra long packing box has special packing rings for handling butane; stainless steel drive shaft prevents corrosion; built-in outboard bearing gives perfect alignment; spiral tooth pumping gears; built-in relief valve protects pump against clogged or closed discharge line.

◆ ◆

Fire Extinguisher

Approval by the Underwriters' Laboratories of a pistol-grip carbon dioxide fire extinguisher is announced this month by Walter Kidde and Co., Inc., New York City, manufacturers of gas type extinguishers. The 16-inch-high, trigger-operated extinguisher, which throws out a blanket

of gas and snow to smother a fire by robbing it of oxygen, was given a high rating for a unit of this type and capacity for fighting electrical and flammable liquid fires.

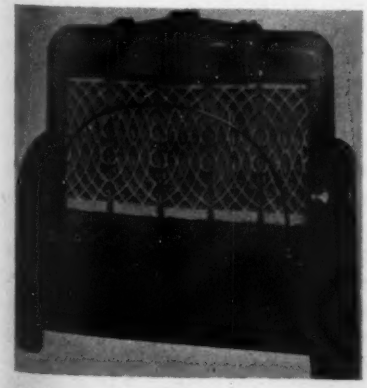
◆ ◆

Radiant Heater

Armstrong Products Corp., Huntington, W. Va.

Model: No. 35. Approved by A. G. A. for LPG service.

Description: A five double radiant heater in the lower price range that has standard size radiants and backwall. Base and panels finished in genuine porcelain enamel, with walnut brown and black trim. The clay backwall is finished in tan, highlighted in walnut brown. The full 2¾-in. width radiants



are finished in contrasting shades of light tan and brown. Equipped with cast iron burner and heavy cast brass valve with air adjuster.

Dimensions: Width, 19¾ in.; depth, 7 in.; height, 17 in.; shipping weight, 26 lbs.; B.t.u., 20,000.

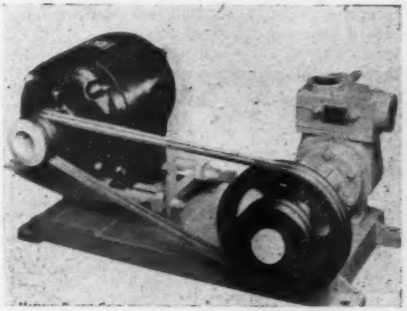
◆ ◆

Double Purpose Pump

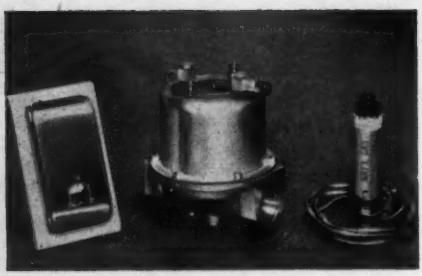
Harman Pacific Co., Los Angeles, Calif.

Model: H-134.

Description: This unit fills the need of operators who desire to use the same pump for unloading tank cars, servicing customers' fuel tanks, and filling bottles. The double ratio V-belt drive



furnished with this unit makes this possible as the pump speed can be altered to suit each operation. The pump is operated at low speed for low capacity when filling fuel tanks or bottles, and at high speed at higher flow rates during the tank car unloading process. Since higher differential pressures are encountered during the fuel tank and bottle filling operations due to small area fittings in the discharge line than that of tank car unloading where a vapor return line is generally used, danger of overloading the motor is eliminated. Provision is made through the quick adjustable motor base for rapid belt changing by pulling a lever that shortens centers between the motor and the pump shafts.



ALL-GAS CONTROL SET
NO ELECTRICITY NEEDED

Ideal for butane-propane service. Pilot generator supplies all current needed for operation; no external current needed. Absolutely quiet operation. Pilot light failure safely shuts off gas valve. Attractive new flush surface mounting thermostats. Package set furnished complete with pilot generator, B-60 series gas valve, T-80 series thermostat, and 40 feet of wire; everything you need for safe, accurate remote gas control service.

Send for new 1940 Complete Catalog

GENERAL CONTROLS

267 5th Avenue New York City

450 E. Ohio St. Chicago, Ill.

McNAMAR

Truck Tanks
Transports
Skid Tanks
Storage Tanks
Underground Systems

We fabricate to your individual requirements.

McNAMAR
BOILER & TANK CO.

TULSA, OKLA. SALEM, ILL.

Campers-Hunters Rent LPG Service

A SPECIAL propane gas service to hunting and fishing parties, campers and owners of automobile trailer houses, being supplied by the Fergas Co., of Clovis, N. M., is a growing source of revenue to that firm, according to F. T. Smith, partner in the business with F. A. Ruggles.

The company, for a small rental fee, plus cost of the gas on a gallonage basis, connects up two 20-lb. containers of propane in the average installation for such purposes, which is sufficient to supply a small cooking stove for two or three weeks. A special installation was made for the state trapper of New Mexico in a trailer which he uses in hunting wolves and coyotes. Mr. Smith sees possibilities for future expansion of this class of service so that tourists, campers and others traveling about the country may enjoy the modern conveniences of their homes even though far from city gas mains.

Agricultural Applications

New Mexico farms and large ranches also present many opportunities for expansion of the butane-propane business. The Fergas Co. recently installed butane equipment for conversion of six farm tractors from gasoline operation on the 4,000-acre ranch of John Garrett, a few miles north of Clovis.

But the business did not merely de-

velop of its own accord. The Fergas Co. spent six months in Clovis before it did a "dime's worth of business," as Mr. Smith put it. "We had to do a lot of educational work as few knew anything about LP gas, but when we secured a few customers and established a policy of giving them good service before everything else, our business grew and is still expanding," he explained, adding "We never let a man run out of gas if we can help it and we will get out at any hour of the day or night and travel many miles in any kind of

F. T. Smith, left, part owner of the Fergas Co., Clovis, N. M., and Ben Clark, salesman, in front of company headquarters.

weather to renew a supply of gas, even though we have to do it at a loss. We maintain a small service truck for this purpose, always available on a 24-hour basis. Last winter after Christmas, with temperatures ranging below freezing and sometimes with heavy snows to hurdle, we maintained our service on a satisfactory basis."

The company's business has grown

CLOW

GASTEAM RADIATORS

combine

the SUPERIORITY of radiator heating
the FLEXIBILITY of individual heaters
the CONVENIENCE of butane gas

A 14 Room School near Dallas, Tex.

CONSTRUCTION

Walls—13-in. brick and tile
Wood floors **Celotex ceilings**

SIZE OF BUILDING

Cubical content ..... 94,200 cu. ft.
Floor space ..... 9,420 sq. ft.

HEATING SYSTEM

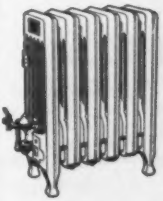
37 Clow Gasteam radiators—2792 sq. ft. steam

BUTANE CONSUMPTION

Season 1939-40—2566 deg. days—*3136 gals.
***This includes fuel used for 870 sq. ft. Gasteam installed in an adjoining gymnasium.**

HEATING REQUIREMENTS

2178 degree days normal.
Radiation sized for 0° F. outside temperature.



Each radiator makes its own steam heat with gas.

No basement, boiler or steam piping used.

For Heating a Single Room or An Entire Building

JAMES B. CLOW & SONS
201-299 North Talman Avenue, Chicago, Ill.

NEW

Insulated Head for

Pioneer Butane Gas System

Insulated Head is an exclusive (Patent Pending) Pioneer feature, and gives our dealers a BIG selling advantage. Insulation protects against summer overheating and winter freezing. Pioneer Plants conform to ASME code, and are UNCONDITIONALLY GUARANTEED for 5 YEARS! Write for Bulletin giving complete details of the easy-to-sell Pioneer Line.

Ewing Butane Gas Co.

DALLAS, TEXAS

FOR 18 YEARS

MANUFACTURERS AND MARKETERS OF NATURAL GASOLINE

BUTANE and PROPANE

IN THE MID-CONTINENT AND GULF COAST AREAS

●

WARREN

offers a highly trained and experienced personnel, together with the enviable record of 18 years in the production of specialized fuel of the highest quality. Our supply is dependable — our service efficient.

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WARREN

PETROLEUM CORPORATION

TULSA, OKLAHOMA

P. O. Box 1589 • L. D. 321

within about 3 years from zero to a LPG supply, equipment and appliance service which extends from Clovis northward 285 miles, southward 200 miles, westward 125 miles, and eastward across Texas-N. M. border.

In addition to bulk stations in Taos, Roy, Carlsbad, Elida, Infield and San Jon, all in New Mexico, the Clovis firm provides LP gas service to several towns, including Fort Sumner and Melrose, N. M. Butane is supplied through two tanks, with a combined capacity of 2500 gals. to approximately 100 customers in Fort Sumner, and propane gas from four 1000-gal. tanks to Melrose. Mr. Smith states that his company expects to install another 1000-gal. tank at Fort Sumner before winter.

The Fergas Co. supplies straight propane gas service from containers or cylinders ranging in capacities from 20 to 300 lbs., each. It also operates supply trucks for delivery of butane and propane. The firm has no meter service but serves all customers on a gallonage basis and its installations are mostly above-ground.

A wholesale appliance and equipment business, serving 35 local dealers in New Mexico, also is operated by Mr. Smith and Mr. Ruggles under the name of the New Mexico Butane-Propane Equipment Co., with Clovis as headquarters.

◆ ◆

Lloyd Cantrell is Manager Only

Lloyd L. Cantrell is manager, only, for the Elkins Butane Gas Co., in Neosho, Mo., and is not a partner in the business, as was mistakenly reported.

The home office of the Elkins Co. is in Wheaton, Mo., and branches have been established in several Missouri towns.

C.N.G.A. Elects L. V. Cassaday To Presidency for 1940-41

Honoring its general manager, L. V. Cassaday, on the occasion of his installation as president of the California Natural Gasoline Association for the year 1940-41, the Lomita Gasoline Co., Long Beach, Calif., tendered a dinner to that association's board of directors and committee chairmen, on July 9 at the Pacific Coast Club in Long Beach. The annual meeting of the directors followed.

L. V. CASSADAY

The meeting was called to order by P. S. Magruder of the General Petroleum Corp., retiring president, who received unanimous expression of appreciation from those present for his administration of the association's affairs. Mr. Magruder then presented the gavel to President Cassaday who conducted the meeting, at which time George L. Tyler was re-elected to the secretaryship of the association.

The next meeting of the C. N. G. A. will be held at Barker Bros., Los Angeles, on Sept. 5. The principal paper scheduled will be read by Jack Thomas, of Natural Gas Equipment, Inc., and will discuss regulators.

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American Gas Service Co. Completes Another Plant

The American Gas Service Co. of Ohio has completed a $20,000 liquefied petroleum gas plant at Hoover and Gettysburg streets in Dayton, Ohio, to augment its service to 1000 suburban and rural customers in that area. The company operates in 12 states and has several plants in Ohio.

The Dayton plant will be a supply depot from which a fleet of delivery tanks will service home installations and will house the company's offices.

COMPLETE FACILITIES

BUTANE
or
PROPANE

Vitally important to every retail marketer of these products, is a dependable and reliable source of supply. Such assurance is yours when you buy Philgas Butane or Propane. Without qualification, Philgas has the most complete production, storage and shipping facilities in the industry. Philgas service gives you high-quality products produced according to rigid specifications plus deliveries when, where, and as you want them.

Philgas
DEPARTMENT

PHILLIPS PETROLEUM COMPANY
GENERAL MOTORS BUILDING
DETROIT, MICHIGAN

NEW YORK | MILWAUKEE
PHILADELPHIA | ST. LOUIS
CHICAGO | AMARILLO
BARTLESVILLE, OKLA.

THE NATION'S LARGEST MARKETER OF LIQUEFIED PETROLEUM GASES

RESEARCH

● **BUTANE-PROPANE *News* wishes to keep its readers informed regarding technical and practical advances concerning research, manufacture, development, and transportation in the liquefied petroleum gas field. In this column will be found a resume of recently published articles, papers, bulletins and books dealing with the industry's various phases.**

Bureau of Standards: Handbook No. 19—Manual of Fire-Loss Prevention of the Federal Fire Council.

Developments and Trends in the Natural Gasoline Industry—J. W. Vaiden and F. E. Fisher. *Petroleum Engineer*, Midyear, 1940, pp. 93, 94.

Refrigeration and Dehydration Fit Plant Into Repressuring System.—*Refiner*, July, 1940, pp. 63-67. In order to fit natural gasoline manufacture into the repressuring program of the K-M-A field, Wichita County, Texas, Continental Oil Co. has restyled its main plant in that area. Natural gasoline extraction is accomplished by compression and refrigeration, while dehydration by diethylene glycol serves to reduce the dew point of residue gas to 80°F., which prevents freezing of equipment at input wells. Described and illustrated. Flow diagrams are shown.

100 Refineries Now Converting Mercaptans with Copper Salts — M. G. Van Voorhis. · *National Petroleum News*, Apr. 17, 1940, pp. R-122, etc. Three plants using copper salts in Perco's solid and liquid processes are converting mercaptans to disulfide with no octane drop and improved gum stability. Two natural gasoline plants using the solid process operate with a minimum of attention and without the necessity for regenerating the catalyst. The liquid process, generally used for cracked gasoline, is also a continuous process involving intimate contacting in a special centrifugal pump, gravity separation, and a regeneration step in which the agent is air bubbled into a tank of the reagent. Operating costs are given, as are results of treating straight-run and cracked gasoline both Perco and doctor treated.

Octane Ratings of a Number of Pure Hydrocarbons and of Some of Their Binary Mixtures—J. Smittenberg, H. Hoog, B. H. Moerbeek, and M. J. Zijdon. *Journal of the Institute of Petroleum Technologists*, June, 1940, pp. 294-303. C. F. R. - A. S. T. M. - Motor method octane numbers have been determined of fifty hydrocarbons, the majority of which were in a very pure state. In addition the octane numbers of some binary hydrocarbon mixtures are given, and a method is described by means of which the octane numbers below zero and above 100 were checked.

Considerations in Valve Lubrication—G. F. Scherer. *Chemical and Metalurgical Engineering*. Mar., 1940, pp. 164, 165. Lubrication of plug valves is a highly specialized field, differing basically from the needs of other fields of industrial lubrication. The lubricant used in a lubricated tapered plug cock performs a number of functions which, in order of importance, may be listed as follows: 1. Effects a plastic seal between the sliding contact surfaces of the valve to prevent leakage of the line fluid and to prevent infiltration of foreign matter between these surfaces; 2. Furnishes a fluid medium for lifting the plug from its seat, both to provide a space for the renewal of the lubricant film and to free the plug from its seat if corroded and frozen together; 3. Effects easy operation of the valve by lubricating the sliding contact surfaces and reducing the friction between them; 4. Provides a protection for these surfaces so that the original surface finish is not marred by corrosion which would increase the turning effort and also permit leakage.

Fire Prevention at Bulk Storage Plants. *Petroleum Marketer*, Apr., 1940, pp. 8-11. This article lists the two main causes of fires at bulk plants, and enumerates precautions to be taken to prevent their outbreak.

Improved Processes in Manufacture of Motor Fuels from Petroleum — Gustav Egloff. *Petroleum Engineer*, Midyear, 1940, pp. 21, etc. A brief review of the many different processes for producing high-octane motor fuels, including polymerization, thermal and catalytic alkylation, etc.

V-Belt Drives, Horsepower Ratings and Service Factors—R. F. Vogt. *Product Engineering*, Apr., 1940, pp. 171-173. Through studies there has been derived an equation, which is now generally accepted by manufacturers of V-belts, for determining the horsepower rating of V-belts. The equation and the terms used in the equation are given. Tables: 1. Characteristics of Prime Mover; 2. Service Factors.

Nomographs for Correcting Volumes of Perfect Gases—J. G. Roof. *Industrial and Engineering Chemistry*, July, 1940, pp. 998-1000. Directions are given for the construction of a pair of simple nomographs for correcting volumes of dry gases over small ranges of temperature (approximately 5°C) and any range of pressure. Each chart is made from readily obtainable graph paper, and the construction requires only a single calculation of one volume correction for any convenient volume and pressure (or temperature).

Gas-Liquid Equilibrium Constants: Methane-Decane System—H. M. Lavender, B. H. Sage and W. N. Lacey. *Oil and Gas Journal*, July 11, 1940, pp. 48, 49. In recent years much interest has been shown in the hydrocarbons of higher molecular weight in natural gases produced from formations characterized by moderately high pressure and temperature. The distribution of such heavier hydrocarbons between gas and liquid phases in equilibrium becomes pertinent information in the prediction of the effect of variations in producing and processing conditions. The "equilibrium constants" for each of the components in the methane-decane system at three temperatures and at pressures from 200 to 2000 lb. sq. in. abs. were established and are presented in this paper.

Attempted Separation of Isomeric Hexenes by Fractional Distillation—F. C. Whitmore, M. R. Fenske, D. Quiggle, H. Bernstein, T. P. Carney, S. Lawroski, A. H. Popkin, R. B. Wagner, W. R. Wheeler and J. S. Whitaker. *Journal American Chemical Society*, Apr., 1940, pp. 795-800. The identification of olefins as reported by Goldwasser and Taylor (*Journal American Chemical Society*, July, 1939, pp. 1751-1769) in their dehydration of certain alcohols is questioned. The Podbielniak - Simons - Taylor column has an efficiency of about fifteen theoretical plates. Fruitless efforts were made to separate by distillation through the Podbielniak-Simons-Taylor column two binary mixtures having boiling point spreads of 2.7 and 1.5°, and a ternary mixture having an overall boiling point spread of 2.7°. This failure is in sharp contrast to the reported separation and identification of six hexenes with an overall boiling point spread of 2.5°. The Podbielniak-Simons-Taylor column is compared in a table with other types of fractional distillation columns.

Phase Equilibria in Hydrocarbon Systems. Propane-n-Pentane System. —B. H. Sage and W. N. Lacey. *Industrial and Engineering Chemistry*, July, 1940, pp. 992-996. The volumetric and phase behavior of nine mixtures of propane and *n*-pentane have been investigated experimentally throughout the two-phase region at temperatures above 130°F. From these primary data the specific volume and composition of coexisting phases of the system have been established within this range of conditions.

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Stoves and Water Heaters in Southern California

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Complete stock of Pressed Steel I. C. C. Cylinders in Los Angeles for immediate delivery.

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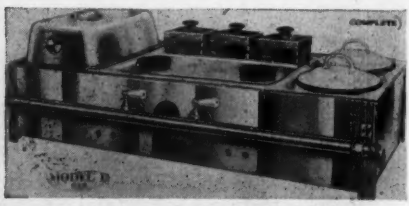

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Department B 3

DICKERSON MANUFACTURING CO.

Springfield, Missouri

Liquefying Natural Gas

THE East Ohio Gas Co., Cleveland, will begin immediate construction of a $1,000,000 liquid gas plant and storage tanks, it has been announced by C. E. Gallagher, president. The purpose of the new plant, which is said to be the first of its kind in the world, is to create a storage system to insure Cleveland's industrial and domestic consumers an adequate supply of gas during winter months or during times of local or national emergency. Its economic importance is believed to be far-reaching.

The plans for the liquid gas plant involve the construction of three spherical, 57-ft. diameter storage tanks, into which will be stored 250,000 cu. ft. of liquid gas, which is equal to 150,000,000 cu. ft. of natural gas. Under the process outlined, the gas will first be compressed under 600 lbs. pressure and then liquefied by cooling it to a temperature of 250° F. below zero. The tanks will be supplied by Republic Steel Corp. and will be made from special nickel steel and insulated with cork.

Plant Will House Equipment

The plant itself, which will be 145 ft. long and 26 ft. wide, will house the compressors, pumps, and other apparatus, including steam boilers developing 1000 hp. It will be erected by the Gas Machinery Co.

After being pumped into the plant

through the company's regular lines, the gas will be compressed and liquefied through the cooling process, which involves boiling by ethylene and ammonia. Restoration of the liquid to its natural gaseous state for use by consumers will be accomplished by the use of steam applied around the pipes through which the liquid flows from the tank, it has been revealed by official reports.

According to Mr. Gallagher, the plant will be able to liquefy and store the gas at the rate of 4,000,000 cu ft. every 24 hours, but the vaporization process can take place at the rate of 3,000,000 cu. ft. per hour, or 72,000,000 cu. ft. a day.

Inadequate Supply Prompted Idea

The Cleveland company's plan for storing liquid gas to take care of peak load demands was evolved after it was found that its maximum daily supply of 200,000,000 cu. ft. coming from Ohio and West Virginia fields was inadequate in emergencies. Because of the fire hazard and the tremendous space required, it was considered impractical to store the gas in its natural state. It was estimated that in order to store 150,000,000 cu. ft. of gas in its vapor form, about 30 huge tanks and acres of ground would be necessary, a thoroughly impractical plan; specially within corporate limits.

In its liquid form, the equivalent of 150,000,000 cu. ft. of gas will be stored in 1/600th of the space required for natural gas. In consistency the liquid gas will be similar to water, and because it is under no pressure when stored, the fire and explosion hazard will be eliminated.

IT'S A **Beauty!**

. . . and a "WINNER" on PERFORMANCE !

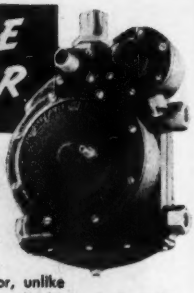
"PACIFIC'S" new Thermolator has *everything* . . . beauty, efficient, economical performance and right price! Shown here is the vented Thermolator Model TV. Looks like a high-grade walnut radio cabinet. Other finishes optional at slight additional cost.

There's a big market for *"Pacific" Thermolators* which are made in a wide range of sizes in vented, gravity and fan-forced-air models. Let these popular heaters earn you good profits on installations in homes, auto courts, resorts, schools, and the many other "hot" prospects for LPG appliances of *"Pacific"* quality.

Write today for complete information on Thermolators . . . also the great line of *"Pacific"* Floor Furnaces, Wall Heaters, Central Heating Units, Water Heaters. Address Dept. BN-9.

PACIFIC GAS RADIATOR CO.
Main Office and Factory
Huntington Park, Calif.

The BUTANE CONVERTER That's Outstandingly Superior



The Dickson Butane Carburetor, unlike ordinary converters, is a compactly designed, trouble-free unit—completely self-contained. By means of Dickson's "unique" vaporizing principle—Butane is efficiently converted from its liquid to a fully dry gasified state.

For Converting Gasoline-Operated TRUCKS TRACTORS BUSES & POWER UNITS to Butane

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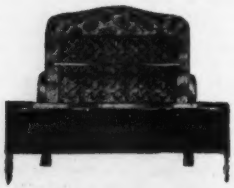

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CIRCULATORS
FLOOR FURNACES
HOT PLATES

All especially designed for use on Liquefied Petroleum Gases.

PEERLESS MANUFACTURING CORP.
Incorporated
Louisville, Kentucky

The Whys of the Safety Code

THIS is the third installment of explanations of the objectives which prompted the writing of the safety code of the National Board of Fire Underwriters, as contained in Pamphlet No. 58. Others appeared in the May and July issues, and more will follow later. Those desiring more specific information may write to our Research Department.

Continuing with Division 1, we come to Section 8.

8—Location of Storage Containers

(a) Why are locations of containers specified?

The location of storage containers with relation to buildings and property lines has been a point of major discussion. Good sense and sound engineering should prevail rather than the literal interpretations of the regulations.

It is common practice to locate cylinder set-ups in cabinets or in the open directly adjacent to a building and such installations are less hazardous than the common oil burner supply installations when a 50-gal oil drum is set up on supports next to a house.

With the increasing use of LPG for domestic and small commercial applications, it is often desirable to fit the jobs with storage tanks ranging from 125 to 500 gals. capacity. It is

good practice to set such tanks away from buildings to reduce the exposure to the tank in case of a fire in the building and also due to the common practice of filling the containers in place to reduce the possibility of a flash during filling operations that might ignite from a possible open flame in the building.

For large bulk storage, good practice dictates to locate such tanks in the clear the same as would be done with gasoline storage.

The distances indicated are arbitrary ones as well as the breaking of the sizing at 500 gals. and discretion should be used in making installations to take into consideration other exposures besides buildings.

To Prevent Vapors Gathering

The reason for prohibiting the location of LPG operating tanks inside of buildings is to prevent the possibility of the accumulations of vapors from leaks or changing connections which might set up a definite hazard.

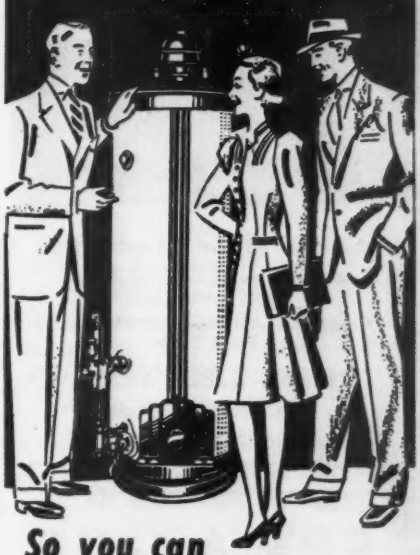
Exemption of these clauses to installations dealing exclusively with gas manufacturing and distribution is based on the fact that in such installations persons acquainted with and competent to handle LPG would be the only ones on the property. Also, such plants incorporate many other safety practices due to the storing and handling of cylinders in buildings and as a general rule the entire plant is reasonably isolated from adjoining exposures.

(b & c) Why a concrete pit for underground containers?

The logic back of the spacing of

HOTSTREAM

guarantees PERFORMANCE



So you can guarantee CUSTOMER SATISFACTION • • •

Your customers are entitled to all the conveniences Bottled Gas can afford. Hotstream Hot Water Service will build customer good will for your product.

There are Hotstream Heaters specially designed for safe, economical operation with Butane and Propane—in every size, for every requirement. Guaranteed 5 to 20 years.

For complete information, prices and catalog, write to Hotstream or, in the South, to these representatives:

L. M. TAYLOR, 3200 Main St., Dallas, Texas
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BULK STORAGE TANKS

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Manufacturers of the GEST-CO line of Truck Tanks

GENERAL STEEL TANK CO.

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BIRMINGHAM, ALA.

SPRAGUE METERS

for

PROPANE-BUTANE SERVICE

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Write for Particulars

SPRAGUE METER COMPANY

Bridgeport, Conn.
Los Angeles, Calif.
San Francisco, Calif.

underground containers from buildings is similar to above-ground installations.

In many locations it is impossible to locate a container 50 feet from buildings or property lines and provision is made for this type of installation when necessary by allowing the tank to be installed in a concrete pit and back-filled with sand.

Exposure to a buried tank from a burning building is nil. Exposure to the building from a burning tank is not severe when located a reasonable distance away.

The provision for the concrete pit is twofold. First, to prevent seepage of gas under an adjacent building and second to insure the back-filling of the tank to be a non-corrosive.

(d) Why do the orders call for removal of weeds and combustible material from area adjacent to the tank?

The reason for keeping a plant yard clean is so self-evident that often it is neglected. It is put off until the next day, etc., etc., and usually requires a little manual work, so often no one is given the direct responsibility for keeping things clean. The orders make keeping the tank area clean mandatory and the responsibility rests directly on the owner.

◆ ◆

Butane at Waterford, Calif.

G. E. Armentrout, who is located on the Oakdale highway in Waterford, Calif., is now selling butane for domestic use at his service station.

The LPG installations in the agricultural district surrounding Waterford are reported to have increased more rapidly in number this summer than during any previous similar period.

LPG Winners In Refrigeration Campaign Announced by AGA

The Refrigeration Committee of the American Gas Association has announced the winners in the "Beyond the Gas Mains" Division of the 1940 "Pioneers of Progress" gas refrigeration campaign, according to an A.G.A. bulletin released by Bernard T. Franck, which further states that "the gas utility industry well may be proud of the fine showing which their associates in the liquefied petroleum business have made. During April, May and June, the period of the campaign, sales of Servel Electrolux refrigerators for operation on liquefied petroleum gas showed a substantial and an encouraging increase."

Following are the "Beyond the Gas Mains" Division winners for Sections One and Two, and the prizes they received:

Greatest number of installations per 1000 (or 100) customers: Section 1—Philgas Department, Phillips Petroleum Co., Detroit, Mich.; award, $200. Section 2—Thad L. Fowler, Hattiesburg, Miss.; award $100.

Greatest total number of installations: Section 1—Philgas Department, Phillips Petroleum Co., Detroit, Mich.; award $200. Section 2—Atlantic States Gas Co., Inc., New York; award $100.

Greatest percentage of increase in installations: Section 1—Shellane Department, Shell Oil Co., Inc., St. Louis, Mo.; award, $100. Section 2—Southeastern Natural Gas Corp., Miami, Fla.; award $50.

◆ ◆

Installed First Butane Unit Five Years Ago

The Beck Tractor Service, owned and directed by A. J. Beck, has been established in Saticoy, Calif., for more than five years, during which time the company has specialized on conversions of tractors and trucks for use with butane instead of gasoline fuel.

Mr. Beck has the agency for the eastern half of Ventura county for several carburetors and conversion equipment, extending service and making installations.

Algas Economy Winning Favor Everywhere . .

"Economy with increased power." That is the report coming from dealers and mechanics handling Algas Butane Carburetion Equipment.

In every section where butane-propane fuels are available, Algas units are being installed on trucks, busses and industrial power units. Mechanics report this perfected equipment gives maximum economy . . . and more power.

The simplicity of Algas equipment brings praises too from mechanics and dealers. Simplicity means lower installation cost, followed by trouble-free performance.

Write today for your folder giving a complete, simple and amazing story of Algas Butane Carburetion Equipment.

ALGAS
BUTANE PROPANE
CARBURETION

American Liquid Gas Corp.

1109 Santa Fe Avenue.
Los Angeles, Calif.

MANUFACTURERS SOLELY OF BUTANE CARBURETION EQUIPMENT

Anticipate Your LPG Requirements

The busy season has started. Rush orders handled rapidly from our Dallas and Atlanta stocks.

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GAS EQUIPMENT CO., INC.
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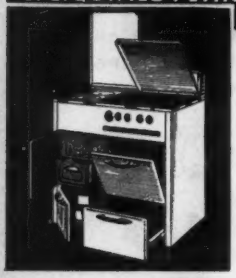
Liquefied Petroleum Gas Equipment

Most Complete Line of GAS RANGES For LIQUIFIED PETROLEUM GASES



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CROWN
Range for HEATING COOKING and BAKING

A complete 4-burner Gas Range with large circulating heater—all in one unit. Streamlined—Beautiful—Convenient.

One of many "Fast Sellers" in the Crown Line. Write for Catalog.

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4631 W. 12th PLACE, CHICAGO
Originators of
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R. W. THOMAS

Phillips Petroleum Co. Forms New Firm to Make Rubber

R. W. Thomas, head of Phillips Petroleum Co.'s Philgas Department, was elected president of the Hydrocarbon Chemical & Rubber Co. at a board of directors' meeting held in August. Other officers elected are: Waldo L. Semon, vice-president and director of research; Hy Byrd, secretary; H. P. Gangwer, treasurer.

A. B. Cameron, formerly manager of Philgas retail operations, will assume active management of Philgas Division with headquarters in Detroit.

The newly formed Hydrocarbon Chemical & Rubber Co. was organized by the Phillips Petroleum Company and the B. F. Goodrich Co. to manufacture a new synthetic rubber. Rapid progress is claimed in the adaptation of the new product to many commercial needs and production is being increased substantially to place samples in the hands of industrial and military users.

In addition to his duties as president of the new company, Mr. Thomas retains responsibility for Philgas activities as part of the Special Products Department.

◆ ◆

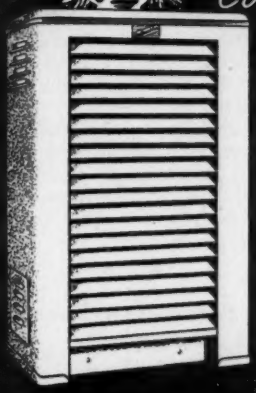
Russell Palmer Passes Away

Russell Palmer, publisher of the *Petroleum World*, Los Angeles; *World Petroleum*, New York, and *Petroleum Times*, London, died Aug. 8 in La Jolla, Calif.

He had gone to La Jolla on vacation from his Pasadena home, and took ill very suddenly. He was 50 years old.

A NEW TYPE OF HEATING PLANT

Combines Beauty with Economy



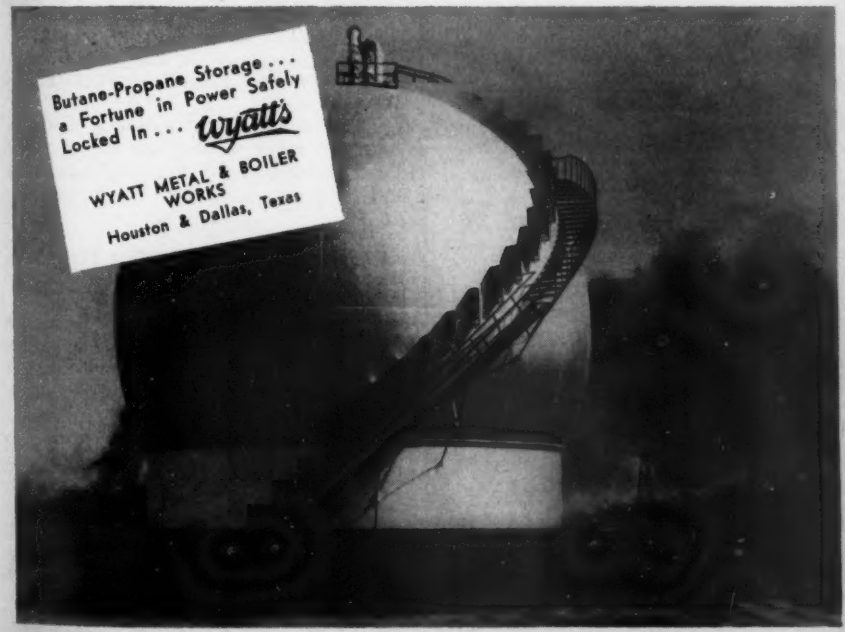
Automatic Cabinet Heater for L P G

A real Winter Air Conditioner . . . it Heats, Circulates, Humidifies and Filters. Downward heat discharge and fan pressure keeps "living zone" cozy. No more cold floors . . . no waste to ceiling. Combustion confined within sealed radiator . . . no fumes or sweating. Completely reheats room air many times hourly. Power cost averages but a penny a day. Safety pilot, automatic control and high efficiency burner insure safe, low cost operation. Sturdy, rigid cabinets. Baked finish (burled walnut, rust brown or olive green), chrome trim.

DEALERS: Write for prices, discounts and full information.

THE OHIO FOUNDRY & MANUFACTURING CO.
"Quality Heating Equipment Since 1846"
Steubenville, Ohio, U. S. A.

FAN • FORCED CIRCULATING HEATER



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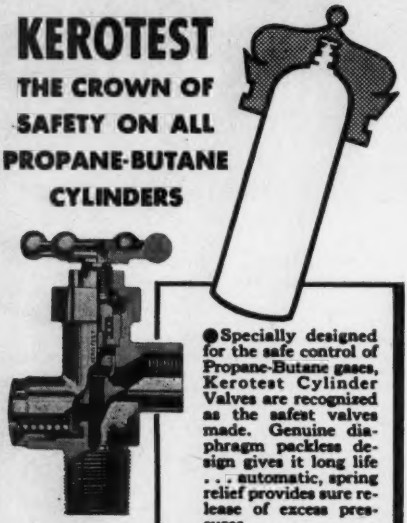
THE CROWN OF SAFETY ON ALL PROPANE-BUTANE CYLINDERS



●Specially designed for the safe control of Propane-Butane gases, Kerotest Cylinder Valves are recognized as the safest valves made. Genuine diaphragm packless design gives it long life . . . automatic, spring relief provides sure release of excess pressures.
Write for catalog.

KEROTEST
KEROTEST MANUFACTURING CO.
PITTSBURGH, PA.

For Safety and Economy

ETHYL MERCAPTAN

Purified

The ACCEPTED standard odorant for liquefied petroleum gases.

MALLINCKRODT CHEMICAL WORKS

ST. LOUIS NEW YORK

California Sealers Will Meet In Santa Barbara Oct. 9-11

The fifth annual convention of the California Association of Weights and Measures Officials will be held at Santa Barbara, Calif., Oct. 9-11, and in addition to an extensive speaking program there will be a large exhibit of models of weighing and measuring equipment by various manufacturers.

C. A. Page, sealer for Santa Barbara county and vice president of the State association, has charge of program arrangements and it is his expectation that sealers from every county in California will be in attendance.

◆ ◆

Philgas Forms New Special Products Department

F. H. Andrews, formerly district manager of the New York office of the Philgas Department, Phillips Petroleum Co., has recently moved to the Detroit office to assume his new duties as manager of the tank car division, succeeding G. R. Benz. The latter has been transferred to Bartlesville, Okla., as assistant to R. W. Thomas, manager of the newly formed special products department of the Phillips Petroleum Co.

The old Philgas Department under the reorganization will become the new Philgas Division of the Special Products Department.

◆ ◆

Wood Lake, Minn., Put On Butane Map by Bendix Co.

The Bendix Co., operating a franchise for the sale of bottled gas and appliances in the Wood Lake, Minn., area, has made in that community 109 installations up to the beginning of summer.

Liquefied petroleum gas has become widely popularized in the territory worked by the Bendix Co., because of a planned, educational campaign to acquaint people living in small towns and on farms of its superiority to other fuels. It is the company's ambition to install LPG in every home in the district.

Comparative Heat Costs Tabulated by "Handigas"

Comparative costs between electricity and "Handigas" (liquefied petroleum gas) are revealed in the sales manual of the Handigas Company of Ohio, Lebanon, Ohio.

The cost of electricity with heat content equal to one pound of Handigas is shown in the table below:

Price per kw. hr.	*Electricity*	*Handigas*
6 cents	37.8 cents	7.5 cents
5 cents	31.5 cents	7.5 cents
4 cents	25.2 cents	7.5 cents
3 cents	18.9 cents	7.5 cents
2 cents	12.6 cents	7.5 cents

It is also shown the B.t.u. content in 6.3 kw. hr. is equal to the heat content in one pound of LPG.

◆ ◆

M. J. Turck Becomes Sales Manager for Renown

Announcement of the appointment of Merton J. Turck as sales manager of the Renown Stove Co., Owosso, Mich., has been made by B. A. Nagelvoort, the company's general manager.

Mr. Turck comes to Renown from the Andes Range and Furnace Corp., of Geneva, N. Y., where for the past year and a half he had charge of sales in western New York and western Pennsylvania, with headquarters in Buffalo.

◆ ◆

Warren Petroleum's Illinois Plant Will Produce LPG

Announcement has been made that the Warren Petroleum Corp., of Tulsa, Okla., will build a natural gasoline plant in the Salem-Lake Centralia field of Illinois. Gas will be processed from the wells of Magnolia Petroleum Co., Shell Oil Co., Inc., Ohio Oil Co., John R. Mitchell, W. C. McBride and others.

The new plant will produce propane and butane in addition to natural gasoline.

LET'S CHECK ☐ YOUR BUTANE, PROPANE REQUIREMENTS NOW

	NO	YES
1. Are you purchasing your butane and propane from the nearest source of supply?	☐	☐
2. Are you buying at current competitive prices?	☐	☐
3. Do you now have a dependable, year 'round source of supply?	☐	☐
4. Do the specifications of the butane and propane you are now buying give the best operating results for your particular needs?	☐	☐
5. Are you getting prompt and efficient personalized service?	☐	☐

Now is the time to decide about your butane and propane requirements for the winter season. Investigate Anchorgas! Write or wire today.

ANCHOR

PETROLEUM CO.

Butane and Propane Exclusively

ATLAS LIFE BLDG.. TULSA. OKLA.

HUMPHREY
Quality Appliances for
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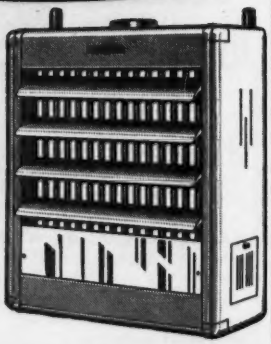

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Indiana State Teachers College Will Use Philgas

The Indiana State Teachers College, Terre Haute, Ind., had installed in July a Philgas system and a Tappan cooking range for the home economics division, a department that is becoming increasingly popular as a result of the rapid spread of dealer activities in the liquefied petroleum gas field.

The Terre Haute distributors of Philgas, Daniel Bros., located in the Twelve Points district, made the installation. With a branch store in Dana, Ind., this firm sells largely on the self-service basis and carries a full line of LPG appliances.

◆ ◆

T. L. Renfro is Manager of Sales For Smith Precision Products Co.

T. L. Renfro, for the past six years special field representative of the Oil Well Supply Co., has joined the Smith Precision Products Co., of South Pasadena, Calif., in the capacity of manager of sales.

Mr. Renfro has been identified with the drilling and production departments of the oil industry for 15 years, the last 10 of these being in the San Joaquin valley of central California.

◆ ◆

Shell Oil Co Moves Shellane Department to Chicago

The Shellane Division office headquarters of Shell Oil Co., Inc., which has formerly been located in St. Louis was transferred to 624 South Michigan Blvd., Chicago, on Aug. 12.

The direction of the Department will remain in the hands of F. B. Boice.

◆ ◆

Ideal Gas Co. Moves Office

The Ideal Gas Co., formerly located in St. Marys, Kan., has moved to Beloit, Kan. This company was organized early in 1940 by Roy L. Hamilton, who remains the principal stockholder.

Reid West will have charge of sales and the office and Vernon Wagner will handle service out of Beloit.

Westland Oil Co. Establishing Plant in Minot, N. D.

The Westland Oil Co., through its president, R. J. Coughlin, has announced the establishment of a propane bulk plant in Minot, N. D. Storage tanks are now under construction and are expected to arrive early in September. The LPG will be shipped to Minot in 10,000-gal. tank cars from Mid-Continent refineries. Equipment for bottling the fuel will also be installed.

Bottled propane is already being sold in the Minot territory by the company, and when the bulk plant is complete, dealers will be appointed in several surrounding towns.

A full line of liquefied petroleum household appliances will be carried.

◆ ◆

Installations by King Bros., Inc., Extending Throughout Northwest

With recently installed bulk plants for dealers in Portland, Eugene, The Dalles and Bend, Ore., and Walla Walla and Toppenish, Wash., King Bros., Inc., of 3500 S. E. 17th Ave., Portland, are rapidly pushing their butane tank business to important centers in the Pacific northwest. The butane division is under the direction of William Fogle, superintendent and production manager of the firm.

King Bros., Inc., are designers, engineers, fabricators and erectors of underground and above-ground plants and make bulk, transport, mobile and skid tanks.

◆ ◆

Dr. A. E. MacGee, Skelly Oil Co. Moves Office to Kansas City

Dr. A. Ernest MacGee, of Skelly Oil Co., transferred his headquarters from the Chicago office of the company to the Kansas City office on July 15.

Dr. MacGee directs for the company the sale of special hydrocarbon fractions including solvents for the rubber and paint industries and the wholesale distribution of propane, butane and other LPG gases.

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C & I Natural Gas Co. Formed in Cokato, Minn.

The C & I Natural Gas Co. is the name of a new concern that has been formed in Cokato, Minn., to engage in the liquefied petroleum gas business in Wright county and parts of Meeker, McLeod and Carver counties, Minnesota.

The owners of the new company are Chester Ogaard, a former partner in the Cokato Hardware & Implement Co., and Iver Loe, proprietor of the Loe Electric Service in Hutchinson, Minn. Maurice Ogaard will also be associated with the company. In addition to handling LPG, a full line of appliances will be carried.

Mr. Loe's Hutchinson store will represent the new company in that town and carry a stock of appliances.

◆ ◆

West Otter Tail Service Opens New Headquarters

West Otter Tail Service Co., engaged in the sale of liquefied petroleum gas and appliances in Fergus Falls, Minn., since April, 1939, celebrated the opening of its new store in late July with afternoon and evening showings for three days of a motion picture presenting the operation of gas appliances on LPG. Also, there were attractive gifts and coffee for those who attended.

A. R. Schulz is manager of the company and J. D. Kinne is in charge of sales.

◆ ◆

Smith Meter Co. Issues New High Pressure Meter Catalog

A new, eight-page catalog of high pressure meters for the petroleum industry has been issued by Smith Meter Co., 5743 East Leneva St., Los Angeles. It is known as Bulletin No. 126 and gives detailed descriptions and photographs of the entire line of high pressure meters manufactured by the company.

The bulletin may be had without charge by addressing the above office or writing to any of the branch sales offices in Dallas, New York, Chicago and Cleveland.

William Wade Secures 25-Year Franchise for Payson, Ariz.

The Board of Supervisors of Gila county, Ariz., recently gave to William Wade a 25-year franchise to serve liquefied petroleum gas to the residents of Payson, Ariz., an unincorporated community.

The franchise includes the privilege of establishing an underground gas distribution system and the building of the necessary storage tanks, plant and equipment for best serving the town.

◆ ◆

Men from Other Business Fields Join the Gas Appliance Co.

Robert Renner, manager of the Gas Appliance Co., in Ironton, Ohio, has announced two personnel additions.

One is Walter L. Henry, who, for 32 years, has been engaged in the jewelry business in Ironton. The other is M. L. McClung, formerly in the chain grocery business, who has been assigned the distributorship for Lawrence county for the Gas Appliance Co.

◆ ◆

Peoples Gas Service Co. Opens Office at Lancaster, Ohio

A new office of the Peoples Gas Service Co., has been opened in Lancaster, Ohio, at 113 E. Main St. M. W. Ewing is manager.

The company is trying out a plan of giving demonstrations of LPG appliances upon request, regardless of the number of individuals attending. It is providing many excellent prospects for fuel and appliances.

◆ ◆

C. S. Merriman Co. Remodels Store in Clovis, Calif.

The C. S. Merriman Co., of Fresno, Calif., celebrated the reopening of its branch store in nearby Clovis on Aug. 17. For some time previously, the store had been undergoing extensive remodeling and enlargement to care for the expansion of business in the Clovis area, a rich fruit and agricultural district.

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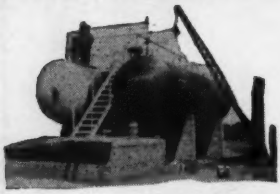

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Carrington, N. D., Propane Plant Is Owned by the Shettlemores

The new propane bulk plant at Carrington, N. D., was scheduled to be in full operation shortly after the middle of August. The first tank car of fuel was unloaded Aug. 17 and deliveries to customers in the surrounding territory began the following week.

The Carrington plant, which will have two 10,000-gal. storage tanks and a 30x70-ft. steel warehouse, represents an investment of approximately $20,000, and is owned by W. E. and D. E. Shettlemore (who also own the Bemidji Bottlegas Co., of Bemidji, Minn.), and not by Carrington business men as was formerly reported.

John Kirkpatrick, who has been with the Bemidji Bottlegas Co. for two years, will supervise the Carrington undertaking.

◆ ◆

Long Beach, Calif., Accepts Bid for Standby Plant

A bid of $218,760 by the Oil Field Construction Co., Long Beach, Calif., for the construction of the city's proposed butane-propane air-mix standby gas plant, has been accepted by the city upon the recommendation of W. H. Partridge, gas superintendent, and Harold W. Wickstrom, consulting engineer who designed the plant.

The bid provides for 22 tanks, 76 in. in diameter and 105 ft. long, with a capacity of 502,089 gals. The contract must be completed by next Dec. 15.

◆ ◆

Flagstaff, Ariz., Passes New LPG Ordinance

Flagstaff, Ariz., has passed an ordinance governing the installation of liquefied petroleum gas plants. By its provisions, a special permit from the fire prevention and inspection bureau must be obtained for storage or equipment designed for more than 100 gallons.

The ordinance is known as the Flammable Liquids Code and became effective July 8, immediately following enactment.

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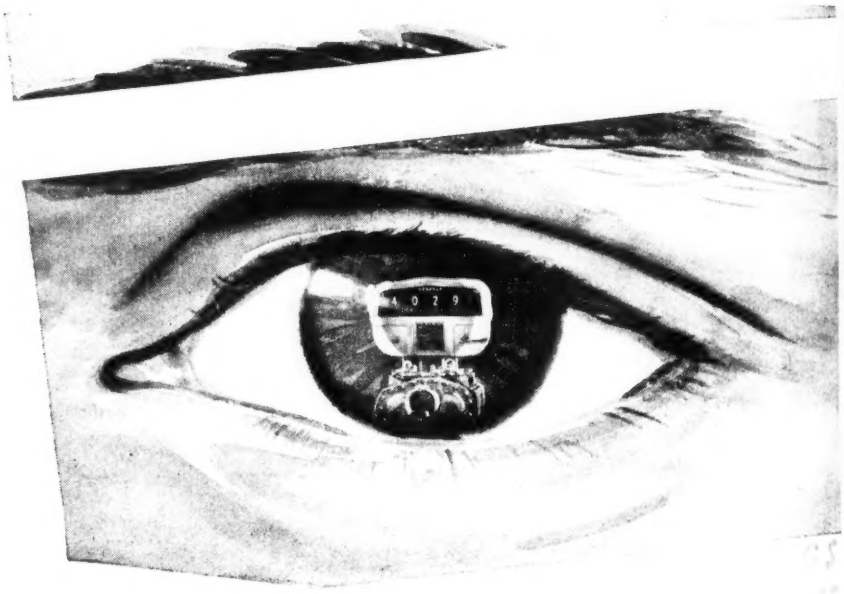

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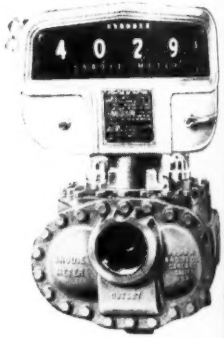

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